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Professional Future

ASPECTS OF EDUCATION AND TRAINING

IN its several reports on education and training and, not less, by the opportunities it has provided for discussion of these matters, the Institution of Electrical Engineers has established itself as the appropriate authority on the subject, as indeed it is recognized to be by the Ministry of Education. Similarly by its activities in other directions the Institution is regarded by the world at large as the mouthpiece of the electrical profession.

Local Initiative

The references to these aspects in the inaugural address of Prof. E. B. Moullin as president of the I.E.E. for the coming session were apt to the occasion. The Institution, while prescribing an acceptable code of professional conduct and coordinating all the diversified electrical interests, allows full scope to the priceless human quality of initiative by Local Centres and Groups (thus providing a model for government in general) which, in turn, evokes a vast amount of enthusiastic voluntary effort among individuals. These, as a reward, receive a post-graduate education of great value, and this links up with the presidential attachment of chief importance to communal life in university education.

Universities offer the additional advantage that, in a period of character formation, students are subject to the broadening influence of those studying other subjects than engineering. Knowledge alone is not enough. The difference between the university-trained man and others does not, or should not, lie so much in his technical equipment as in his ability to take advantage of the background a university provides to apply his learning more readily to conditions of the daily round.

The especial importance of suppleness of mind to the electrical engineer is, as the president pointed out, that although primarily an engineer he is something more. The "plus" is owing to a greater dependence on science and to the rapidity with which a number of branches of science can be applied in electrical engineering. It was noticeable, for instance, at the same meeting how large a proportion of Institution premiums were awarded for successes in fields hardly known to an older generation, such as those relating to different frequencies.

The Wider Outlook

Avoidance of intellectual grooves, always a pitfall to electrical engineers, is especially necessary at the present time when what Prof. Moullin terms "administratism" threatens to assume undue proportions in all countries. For that reason alone proposals to set up mono-technic colleges are to be deprecated. The danger is that such establishments would turn out narrow specialists able, no doubt, to give accurate statistical solutions of any problems put to them by administrators but little more. Their approach would, moreover, tend to be related to past and present practice without envisaging what the future, which so quickly becomes the present, may offer.

Yet in all electrical work, accent must be on the future. Through the consequent limitation of outlook electrical engineers would be unfitted to take their share in directing their activities to fruitful ends. This would be an unmitigated loss, not only to the profession, but also to the nation.

Prof. Moullin's views on the place of research in the university and in industry will, we believe, meet with general agreement among members of the Institution. So, surely, will his suggestion that academic qualifications in a lecturer should be subordinated to an understanding of what students really do need in life. In these and many other ways the presidential address fulfilled what we take to be the aim of such addresses: that is to provide not only a stimulus to the ideas of members but also matter for their continuing thought.

FAIR TRADING

ALTHOUGH it may seem to be somewhat belated, the Australians are showing a flattering interest in the activities of our Electrical Fair Trading Council. These activities are commented upon favourably by the official journal of the Electrical and Radio Development Association of New South Wales which reports that the Association has a sub-committee "investigating thoroughly the local application of some form of fair trading policy in the Commonwealth." Further, it is said that in Victoria, the Electrical and Radio Federation has drawn up a draft constitution for the consideration of all parties concerned.

COMPULSORY REGISTRATION

IN the September issue of the *Electrical Supervisor* reference is made to the winding up of the "National Committee on Statutory Wiring Regulations and Registration," which was set up in 1937 after the publication of a report by the A.S.E.E. presenting the case for compulsory regulations and registration of contractors and operatives. Much work was put in by the Committee to secure the adoption of its recommendations, but it met with little success. An I.E.E.-sponsored Committee, which reviewed the matter on technical grounds, held that the case for compulsion had not been proved. Approaches to Government Departments met with sympathy, but it was explained that the state of Parliamentary business did not permit any official action. Not all of the original constituents of the Committee stayed the course and possibly the advent of the British Electricity Authority radically altered the situation. No doubt the Committee drew attention to evils which needed and still need rectification, but the *Supervisor's* claim that the A.S.E.E.'s report (in 1936) brought the subject into open discussion for the first time is surely not well founded.

LANDLORDS' CHARGES

FROM time to time we have called attention to the iniquitous charges made by landlords for electricity passed on to their tenants. Some rent tribunals have been able to deal with the matter but, as the law stands, there is apparently no reason why landlords should not extract as much as they can. The matter was raised at a recent meeting of the North Western Electricity Consultative Council when it was decided to ask the Ministry of Fuel and Power to make it illegal for anyone to charge tenants extortionate prices for electricity. Although the extent of this practice may be small, anything which militates against the free use of electricity should be removed.

GAS WASHING

AMONG the reports presented at the Smoke Abatement Conference, reported in this issue, was one advocating the installation of gas-washing plant at the new Carrington power station. Not only would this method of dealing with possible traces of sulphur products emitted from the chimneys add considerably to the cost of electricity but, unlike grit-extraction plant (also costly, but usually necessary), it would probably increase cause for complaint. In our issue of 1st July it was pointed out that gases leaving tall chimneys at normal high temperatures are expelled high into space and very widely dispersed, whereas with temperatures reduced by gas washing they tend to trail out at chimney-top level and, under certain atmospheric conditions, come to ground in the neighbourhood of the station.

Change of Frequency and Voltage

By
J. L. WATTS, A.M.I.E.E.

1.—Effects on the Operation of A.C. Equipment

IT is the characteristics of a piece of electrical equipment which determine whether or not it can be used at a frequency and/or voltage which differ from those for which it was designed.

An air-cored inductor, or choking coil, is equivalent to a resistance in series with an inductance. The passage of a.c. through each turn of the coil is impeded by the resistance of the conductor and by the reactance caused by the electromotive force (e.m.f.) which is induced in each turn by the changing magnetic flux that is created by the current.

The impedance of the inductor is:

$$z=\sqrt{R^2+X^2} \quad .. \quad (1)$$

where R is the resistance and X the reactance of the coil; X is equal to the numerical difference between the inductive reactance X_L and the capacity reactance X_C. In most inductors X_C is very small and can be neglected. In the case of a.c. of sinusoidal wave form:

$$X_L=2\times 3.142\times f\times L \text{ ohms} \quad .. \quad (2)$$

where f is the frequency in c/s and L is the self inductance of the coil in henries.

$$L=\frac{S\times\Phi}{I\times 100{,}000{,}000 \text{ henries}} \quad .. \quad (3),$$

where S is the number of series turns in the coil which are linked with the flux and Φ the value of the magnetic flux (maxwells) produced by I amps; L has a high value when the flux passes through a material of high permeability, such as iron or steel.

The current in an inductor is:

$$I=\frac{V}{Z}=\frac{V}{\sqrt{R^2+(2\times 3.142\times f\times L)^2}} \quad .. \quad (4)$$

where V is the voltage applied to the inductor. The current creates the alternating magnetic flux of maximum, or peak, value Φ_M such that the reactance volt drop V_L limits the current to the value I required to create that flux:

$$V_L=4\times k\times f\times S\times\Phi_M\times 10^{-8} \text{ volts} \quad .. \quad (5)$$

where k is the form factor of the flux. For a sinusoidal wave form k is 1.11, thus:

$$V_L=4.44\times f\times S\times\Phi_M\times 10^{-8} \quad .. \quad .. \quad (6)$$

In most inductors the resistance R is small compared with the inductive reactance X, in which case V_L will be almost equal to the supply voltage V. In this case the magnetic flux will be directly proportional to the applied voltage V and inversely proportional to the frequency of the supply. In the case of a coil without an iron core the magnetic flux will be directly proportional to, and in phase with, the current; so that I will then be proportional to $\frac{V}{f}$.

What happens if the frequency of supply is reduced? Formula (4) shows that the current is increased. The practical effect is that the reactance voltage V_L is reduced [from (5) or (6)] so that with the same applied voltage there is an increase of volt drop V_R available to overcome the resistance of the coil. The current I and flux Φ are thus increased, with increase of V_L; thus the conditions become stabilized with greater current at the lower frequency. In the case of an air cored inductor the limit of reduced frequency is reached when the rate of heat generation in the coil, which is proportional to I^2R, causes the coil to become dangerously hot. The effect of increasing the frequency of the supply to an air cored inductor is to reduce the current and power factor.

The effect of reducing the voltage applied to an air cored coil is to reduce the current in direct proportion; if the resistance R is negligible in comparison with the reactance X so that $V_L=V$, the flux will be directly proportional to the voltage. The degree of increased voltage permissible is governed by the temperature of the coil. Increased

voltage has a very similar effect to reduced frequency; neglecting the resistance of the coil, both I and Φ will be unaltered if the ratio $\frac{V}{f}$ is unaltered, *i.e.*, if both V and f are either increased or decreased in the same ratio.

When an inductor has an iron core L is likely to have a fairly high value, due to the considerable flux produced per ampere in comparison with an air cored coil. As a result V_L is likely to be high compared with V_R. The magnetic flux density (B) gauss in a magnetic circuit is equal to $\frac{\Phi}{A}$, where A is the cross sectional area of the magnetic circuit in a plane normal to the direction of the flux. Fig. 1 shows how the flux density of a grade of transformer sheet steel changes when the magnetizing force varies. The magnetizing force is proportional to the number of ampere turns acting on the circuit, *i.e.*, to $I \times S$.

Magnetic saturation necessitates a very high magnetizing force, or current, for high flux densities. If V_L is required to be proportional to I the value of L must be constant. To achieve this result Φ must be proportional to I, as will be seen from (3), over the working range of flux density. Thus Φ_M must be below the saturation point of the steel. In the case of the Fig. 1 sample of transformer steel Φ_M would not have to exceed about 10,000 lines/sq cm. Since the virtual value of a sinusoidal function is 0.707 of the maximum (or peak) value, the virtual value of the flux density would have to be kept below about 7,070 lines/sq cm.

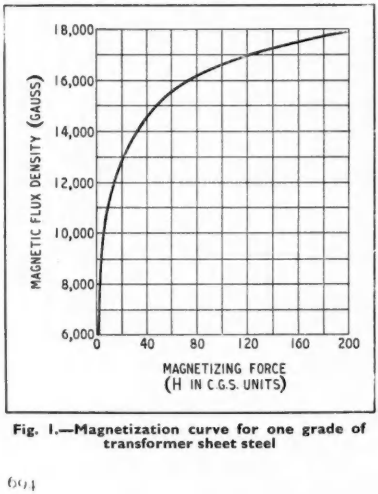


Fig. 1.—Magnetization curve for one grade of transformer sheet steel

Operating an iron cored coil at an appreciably greater voltage, or reduced frequency, may result in the current being increased to such an extent that the core becomes saturated twice per cycle. The flux will then not be proportional to the current at all times; as a result the flux wave will tend to become flat topped instead of sinusoidal. The ratio $\frac{V_R}{V_L}$ will increase at the peak points of each half cycle, so that the current wave will tend to become peaked, as indicated in Fig. 2.

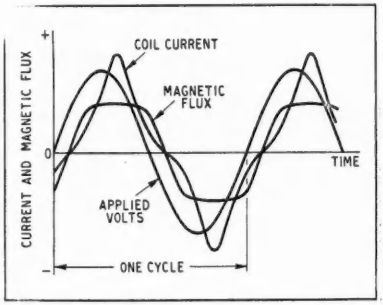


Fig. 2.—Effect of magnetic core saturation

The iron core of an a.c. coil is responsible for iron losses. The changing magnetic flux in the core induces in it e.m.f.'s and eddy currents, causing core heating, which is proportional to I^2R. The eddy currents oppose the effect which causes them and so can be considered to have a demagnetizing action on the magnetic field created by the coil. Thus the effect of eddy currents in the core, or in other conductors linked with the flux, is that the coil current will be greater than otherwise would be the case, the eddy current loss being converted into unwanted heat. Eddy current loss per unit weight, or volume, of core with sinusoidal flux can be estimated from the formula:

$$P_e = k_e \times t^2 \times f^2 \times B_M^2 \text{ watts} \quad .. \quad (7),$$

where k_e is a factor which depends on the core material, t is the thickness of the laminations, f the frequency and B_M the maximum (peak) flux density.

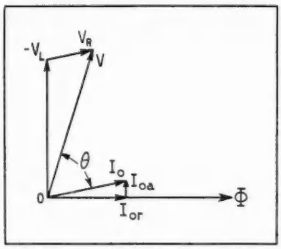


Fig. 3.—Vector diagram for iron-cored coil

If the flux is not sinusoidal the eddy current loss will be proportional to the square of the :

$$\text{Form factor} = \frac{\text{Virtual value}}{\text{Average value}} \quad .. \quad (8)$$

Hysteresis losses also occur in an iron core of an a.c. coil and cause heating and increase of coil current. These losses cause the cycle of flux to lag somewhat behind the coil current and distort the current wave slightly. Hysteresis loss per unit volume, or weight, of core is :

$$P_h = k_h \times f \times B^x_M \text{ watts} \quad .. \quad .. \quad (9),$$

where k_h is a factor which depends on the magnetic material used and is higher for hard steels than for soft steels. The index x may lie between 0.5 and 2.3 but 1.6 is a good average value for normal core materials. Fig. 3 shows that the iron loss component current I_{oa} added to the magnetizing component I_{or} gives the total coil current I_o. The resistive volt drop V_R is in phase with the current I_o, but the iron losses cause the current I_o to be slightly out of phase with the flux Φ. The reactive volt drop V_L leads the flux by a quarter of a cycle.

Increase of coil voltage will increase the coil current and B_M. If the resistive volt drop can be neglected in comparison with V_L the flux density B will be practically proportional to the applied voltage V, provided the core does not become saturated. In any case increased voltage will increase both the eddy current and hysteresis losses, due to the increase of B_M (see Fig. 4).

If the supply frequency is reduced without change of voltage B will increase almost in inverse proportion, provided the core does not become saturated. If B is proportional to $\frac{V}{f}$ and P_h proportional to $f \times B_M^{1.6}$ [from (9)] the hysteresis loss will be practically proportional to $\frac{V^{1.6}}{f^{0.6}}$. Under such conditions hysteresis loss will increase with increase of voltage, or reduction of frequency. Under the same conditions eddy current loss, proportional to $f^2 \times B_M^2$ [from (7)] will be practically proportional to $f^2 \times \left(\frac{V}{f}\right)^2$ and to V^2, so will thus be independent of frequency, again assuming zero resistance and no saturation. Fig. 4 shows that if the voltage and frequency are changed in the same proportion so that $\frac{V}{f}$ is constant and if coil resistance is negligible so that the flux density can also be considered constant, then the total iron loss will increase with increase of frequency, although not in direct proportion. On

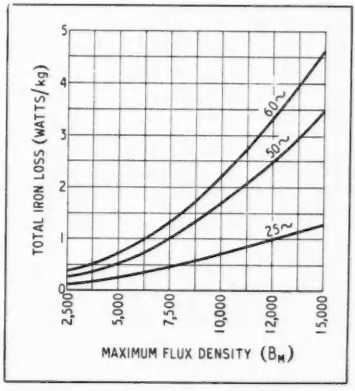


Fig. 4.—Eddy current and hysteresis losses in a sample of "Stalloy," 0.5 mm thick

the one hand and assuming no magnetic saturation, if the flux density is raised from 5,000 to 10,000 by doubling the voltage at 50 c/s the iron loss will be (Fig. 4) increased in the ratio of 3.83 to 1. On the other hand if the flux density is increased from 5,000 to 10,000 by

reducing the frequency from 50 to 25 c/s without change of voltage (assuming B is proportional to $\frac{V}{f}$) the total iron loss will be increased in the ratio of 1.68 to 1.

An iron cored coil which is energized from a source of constant voltage is generally used as an electro-magnet of some sort. The magnetic attraction between poles in contact is :

$$P = \frac{B^2 \times A}{8 \times 3.142} \text{ dynes} \quad .. \quad .. \quad (10),$$

where B is the flux density in lines/sq cm and A is the pole area (in sq cm) in contact. If V_R can be neglected in comparison with V_L and there is no saturation, so that B can be considered proportional to $\frac{V}{f}$, if follows that the pull in this case will be practically proportional to $\frac{V^2}{f^2}$.

The action of an a.c. electro-magnet is considerably modified by the air gap which exists in the magnetic circuit

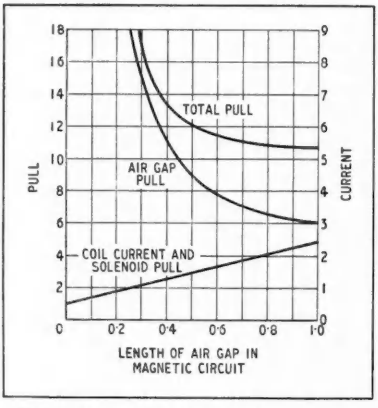


Fig. 5.—Characteristics of a.c. electro-magnet

when the voltage is first applied to the coil. This increases the reluctance of the magnetic circuit and reduces the initial flux density and reactance voltage. When switching on, therefore, there will be an initial large current which should cause the armature, or plunger, to be attracted. In this case the reluctance will be reduced, the flux per ampere and the reactance voltage V_L increased, so that the coil current is reduced, but the flux and pull are increased, as the gap closes. This effect is indicated by Fig. 5. The magnetic pull in an open ended solenoid is proportional to the current, as indicated by the straight "current" line; the curve for "air gap" pull would refer to an electro-magnet with short air gap, while the "total pull" curve would refer to a solenoid having an iron core at the end of the coil.

Effects of Changes

Possible effects of using a shunt connected electro-magnet at less than normal voltage, or more than normal frequency, may be (1) reduced magnetic flux and pull, (2) current less than normal if the electro-magnet can perform its duty with the reduced pull, (3) if the reduced pull does not allow the electro-magnet to close normally the air gap, the coil current may remain at a high value, with risk of burning out of the coil.

Possible effects at more than normal voltage, or less than normal frequency, are (1) increased flux and pull, (2) if the core remains unsaturated the current may be increased practically in proportion to $\frac{V}{f}$; if the core becomes saturated the current may reach a very high value and the coil may burn out.

Secondary effects of reduced voltage are reduced iron loss heating and possible reduced magnetic noise; increased voltage having the opposite effects. Reduced frequency usually causes increased iron losses, while increased frequency reduces the iron losses and possibly the noise. The secondary effects will be modified if the air gap does not close normally.

The primary winding of an unloaded transformer fed from a.c. mains acts as an electro-magnet which has practically a complete iron magnetic circuit. The vector diagram (Fig. 6) is very similar to that of the iron cored inductor (Fig. 3). The primary no-load current I_o has a magnetizing component $I_{o\gamma}$, iron loss component $I_{o\alpha}$ and a power factor cosine θ. The applied voltage V has the component V_R which drives I_o against the resistance of the primary winding and the component $-E_p$ which overcomes

the induced primary (E_p) e.m.f. Due to the closed iron magnetic circuit of a transformer V_R is usually negligible compared with the transformer reactance X_L; thus, when the iron is not saturated, the flux Φ is practically proportional to $\frac{V}{f}$ [from (5) and (6)].

The e.m.f. (E_s) induced in a given secondary winding follows the same relations (5 or 6) and is proportional to Φf, or practically proportional to the applied primary voltage V. Denoting the number of primary turns as S_p and the primary induced voltage E_p, with S_s and E_s for the secondary values, one finds that Φ is proportional to $\frac{E_p}{f \times S_p}$ or to $\frac{E_s}{f \times S_s}$, when iron losses and saturation are neglected. If resistive volt drop is negligible Φ will be proportional to $\frac{V_p}{f \times S_p}$ or $\frac{V_s}{f \times S_s}$, where V_p and V_s are primary and secondary terminal voltages.

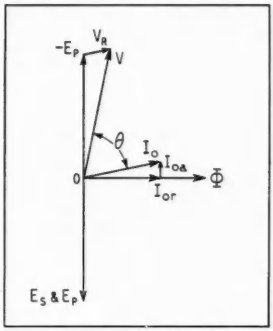


Fig. 6.—Simplified vector diagram of unloaded single-phase 1 to 1 ratio transformer

Thus V_s, which is proportional to $\Phi \times f \times S_s$, will be proportional to $\frac{V_p}{\times S_p} \times \frac{f \times S_s}{1}$, *i.e.*, proportional to $\frac{V_p \times S_s}{S_p}$. So the secondary voltage is practically proportional to the primary voltage and to the ratio of secondary to primary turns, being independent of frequency, provided the core does not become saturated. If the numbers of primary and secondary turns are equal and there is no magnetic leakage the primary induced voltage E_p will be equal to the secondary induced voltage E_s, they being equal and opposite to the primary reactance volt drop $-E_p$.

Engineers and Management

A PLEA for a sense of proportion towards management was made by Mr. R. H. Coates (controller, Southern Division, B.E.A.) in his inaugural address as chairman of the Southern Centre (Portsmouth) of the Institution of Electrical Engineers.

The major responsibility of most corporate members seemed to him to be of a managerial nature, controlling people as teams to achieve broad group objects, but many engineers with managerial duties felt intolerant towards what they considered to be troublesome managerial diversions from pure engineering. Whereas their training was predominantly the codified experience of past engineers, management had not been the object of systematic codification and, unfortunately, there was no general technical language of management.

In retrospect, many basic laws appeared to those who came afterwards to be just common sense. Apparently simple laws were a useful adjunct in learning; even though over-simplified in practice, they were the major part of the teaching tool, namely, the use of precise language. The meaningless jargon that could be written on the subject had to be read to be believed.

Nationalized industries in this country were small in number, but very large concerns. It was evident that there was no well-established best method of managing large industry. They had to learn by direct experience. Engineers, of all people, were the most capable of advancing the knowledge of management since they were the first group trained to employ strictly scientific methods to come into contact with management problems.

A manager did not, could not, manage "over" others; if the best results were to be obtained from the grouped activities of many people, it was essential that the "boss" and all the staff should manage "with" each other.

National Supply Survey

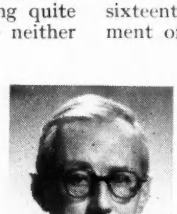
In the inscription accompanying the map of the South West Scotland Electricity Area in our last issue it was stated that the map showed "dense rural in red and sparse rural in grey." Actually the reverse is the case.

I.E.E. Presidential Address

Professionalism or "Administratism"?

IN his presidential address to the Institution of Electrical Engineers last week Prof. E. B. Moullin (University of Cambridge) spoke of the importance of the Institution to the profession and the importance of the professional body to the community.

He began by explaining that electrical engineers were not just a variety of the main species, because they must be engineers in general with something quite specific in addition. They were neither greater nor less than other engineers, but were a species in their own right. He held firmly that this was a fact which must be recognized explicitly if wrong thinking and action were to be avoided.



Prof E. B. Moullin

The aims of the I.E.E. and of a university had certain things in common. The Institution fostered those standards of behaviour which distinguished a profession from a trade. Electrical engineering would not remain a profession if it ever split up into separate parts. The giving of almost "Dominion" status to the four Sections was an act of great statesmanship, for the profession was a coherent whole and any subdivision of it, save by means of internal Sections, would start to ring its death knell. It was especially made indivisible by the complete dependence of all its activities and branches on electrical science as its starting point. It was essentially a learned profession, because the possibility of there being an electrical engineering profession depended, for its beginnings, on the highly intellectual and learned concepts of electricity.

Just now Western Europe appeared to be veering away from the ideals of the professions and tending towards centralized administration. If the administrators got too jealous of the professions or too overwhelming numerically, then external conditions would swamp the Institution because the call would be for technical specialists to act as advisers to administrative boards.

Societies which were founded upon and which exacted professional qualifications were a device for compromising rationally between unrestricted personal liberty and unrestricted compulsion, and thus were an important factor in maintaining a state of civilization. The middle of the sixteenth century saw the commencement of a great revulsion against institutional civilization and its replacement by individualism. Institutional civilization, especially professional, had been steadily coming back ever since. Now it looked as if there was a new revulsion against it, but this time the swing was certainly not towards individualism, but towards "administratism."

An outstanding fuction of their Institution was to supervise the standard of individual professional competence and of professional practice; part of this devolved upon its educational policy. Though absolutely essential, the academic side could not be more than an initiatory part; but the discipline was a sound foundation and the young graduate usually entered industry in a state well suited for learning his professional work.

Even in this country there was a school of thought which urged that the full-time academic courses should not be left to universities alone, but should also be provided by new monotechnic colleges in which only engineering should be taught. The Council strongly disapproved of this proposal because such special colleges would not succeed in keeping their instruction sufficiently wide and basic. Human frailty and unwise enthusiasm would inevitably allow it to lapse towards technology and "instruction for tomorrow" rather than education for the future. The very understandable fear

that the load of engineering teaching might become too heavy for the universities to carry, without detriment, was based on the entirely false notion that the profession and the industry needed very many more university graduates than they had at present. There was no desire for the supply to increase by more than about 10 per cent.

But the special whole-time engineering college would be the very thing for training technical-specialist advisers for sitting-in at administrative boards. Did they want professional electrical engineers to operate the learned profession and industry, or technical-specialist advisers to boards controlling "hardware merchants?" The whole future development of the industry and the development, even the survival, of the profession turned on the choice.

A major activity of the university was the training of research students. If the hundreds of young men under such training were intended primarily for the academic succession their numbers would seem to be excessive. If they were intended for leaders in the research departments of industry it was very questionable whether this training was appropriate. The discipline of and emphasis on continuing every piece of work until there was no detail, however seemingly trivial, which had not been tested and examined until no one could extract any further information from it was cramping and narrowing for industrial research, whose object was to learn to make something sufficiently well for its purpose; three years of this kind of training would make some students unemployable as research workers in industry. This large pool ought not to be regarded as a stored labour force of "reserve operatives" waiting to be directed elsewhere at need. This pool should be distributed through industry for industrial and research training.

Professional Instruction

Law and medicine had their own system of providing professional instruction by their own members in active practice. A corresponding system had been evolving with electrical engineering, and the Council had decided to urge the setting up of a wide network of post-graduate courses to be given by leading exponents in the profession. It was prepared to organize these courses through the machinery of the Institution if they were not provided through other channels, another fruit of the university having flowed out into industry.

The method of operating this network of post-graduate courses was being developed quickly, and technical schools spread throughout the industrial areas would provide the accommodation and play a part analogous to that of public hospitals for instruction by private practitioners.

The Institution was certainly not beset by uncertainty of purpose, by the shirking of fundamental issues, or by false neutrality. But no one could say how far the widespread tendency to break away from professionalism in favour of "administratism" might go, or how much it might break up membership into groups which could no longer owe untrammelled allegiance to the dictates of purely professional competence and excellence.

Institution and University

The new president was introduced by Mr. T. G. N. Haldane with a reference to his long connection with the Schools of Engineering Science at both Oxford and Cambridge Universities, and an expression of particular pleasure in having as the new president an occupant of the Chair of Electrical Engineering at the University of Cambridge, with the founding of which the Institution was so closely connected.

Dr. P. Dunsheath, in proposing a vote of thanks, said he was glad that Prof. Moullin had dealt with the question of the teaching of engineering in isolation. One of the dangers of the mono-technic idea (perhaps a better term would be "techno-monastic") was that if they allowed Institutions such as theirs to promote the idea of ultra-specialization in the engineer they would open the door to the well-educated administrator, having no knowledge of technical matters, employing as second or third in command a not-too-well educated but highly specialized and technical engineer. The Institution was vigilant in this matter.

In the new report of the Advisory Council there was a very specific statement that higher technological education

should be brought within the ambit of the University Grants Committee. That was one of the greatest steps that had been taken to achieve the ambitions of the Institution. Up to the graduate stage there was nothing to learn from the United States. For post-graduate education, if they brought together the university, the technical college and industry, using their joint resources, nothing need be feared in the way of competition from the other side of the Atlantic.

Mr. J. Eccles, seconding the vote, said that perhaps one of the most important parts of the address was that which dealt with the risk of the profession being crushed in the administrative machine.

Mr. P. Good, in proposing a vote of thanks to the retiring president, recalled that during Mr. Haldane's year of office two very important conferences had been held (which adjourned for nearly a year and then met again) of presidents and secretaries of the engineering institutions of Western Europe and America. Also during the year the Institution received Parliamentary recognition of its essential place in the national life by the embodiment of a provision in the Wireless Telegraphy Act that the Minister should consult the Institution before he took action on certain matters which affected the life of the community. That was an added feature in the growth of the importance of the Institution and the retiring president played a leading part in securing it.

Sir Archibald Gill seconded the proposal, and in responding Mr. T. G. N. Haldane remarked, in view of the redecorations, that he had left the Institution at least a little brighter than he found it! It had been a pleasure to him during his year of office to realize the increasing service which the Institution was rendering to the nation.

E.I.B.A. Golf Finals

THE finals of the Electrical Industries National Golf Championship, in aid of the Electrical Industries Benevolent Association, were held on 3rd October at Moor Park. Fifty-four competitors from all parts of the British Isles played over 18 holes medal play. The finals were followed by competitions for the veterans' trophy (presented by the publishers of the *Electrician*) for those in the industry of fifty-five years and over. In the afternoon a foursomes competition was held for championship competitors only and a further match for visitors took place on the west course. The results of these games were as follows:—

Championship finals; winner of the Sir Montague Hughman silver-gilt trophy: Mr. L. Cooke (*British Engineering*), score net 67, handicap 11. In addition as a personal award Mr. Cooke received a silver salver given by Sir Vincent de Ferranti. Championship runner-up: Mr. F. C. Kilburn, score net 71, handicap 17. Mr. Kilburn was presented with the J. L. Wilson trophy and a personal award of a tankard given by the English Electric Co., Ltd. Best scratch score trophy: Presented to Mr. T. Reedy (Watford), score net 78. Mr. L. Cooke was eligible for the best scratch score trophy, but the rules of the competition do not permit two trophies to be won. Mr. Reedy also received a personal award of a tankard presented by Mr. W. Lewis Smith. Veterans' trophy and silver cigarette box: Mr. A. B. Burgess (Southampton), score net 77, handicap 10. Foursomes trophy: Messrs. J. C. Breakey and L. Cooke, score net 68, joint handicap 10, and Messrs. J. Hayward and C. Marshall, score net 72, joint handicap 18. Each of the four competitors received a personal award of a tankard presented by Associated Electrical Industries, Ltd. Visitors' trophy: A silver rose bowl presented to the E.I.B.A. by the Electrical Wholesalers' Federation was won by Mr. R. M. Smart (English Electric Co., Ltd.), score net 69, handicap 10.

Presentations of the trophies were made by Sir Montague Hughman, and a dinner followed at which seventy competitors and guests attended. Mr. G. F. Sills, chairman of the National Golf Committee, presided. Among those present were: Mr. E. C. Holroyde (president, E.I.B.A.), Sir Henry Self (deputy chairman (Administration), B.E.A.), Messrs. A. B. Wildsmith (Director, E.W.F.), W. Lewis Smith (G.E.C.), H. G. McHaffie (A.E.I.), H. Senior Fothergill (secretary, E.I.B.A.), F. G. Nesbitt (Simplex Electric Co., Ltd.), R. Frazer (English Electric Co., Ltd.), A. E. Colter (chairman, Liverpool and Merseyside Area, E.I.B.A.), and E. Glanvill Benn (Benn Brothers, Ltd.).

Mr. A. H. Hughes, national secretary, announced that Sir Henry Self had agreed to join the National Golf Committee for next year's play.

Personal and Social

NEWS OF MEN AND WOMEN OF THE INDUSTRY

THE resignation is announced of **Prof. E. K. Rideal,** who has been Fullerian Professor of Chemistry at the Royal Institution and Director of the Davy Faraday Research Laboratory since 1946. **Prof. E. N. Da C. Andrade** has been appointed Director in the Royal Institution, Resident Professor and Director of the Davy Faraday Research Laboratory from 1st January next. Prof. Andrade has been Quain Professor of Physics in the University of London since 1928.

Mr. K. B. Carlisle has been appointed secretary of Buchanan & Curwen, Ltd., electrical contractors.

Mr. S. B. Warder, M.I.Mech.E., M.I.E.E., M.Amer.I.E.E., who has been appointed mechanical and electrical engineer, Southern Region, British Railways, was educated at Glasgow High School and the University of London. After serving an apprenticeship with Johnson & Phillips, Ltd., he gained further experience with Ferguson, Pailin, Ltd., and later as an engineer with the General Electric Co., Ltd. In 1927 he joined the Swedish General Electric Co. (later Asea Electric, Ltd.) as an engineer in the Export Department, and eventually succeeded to the position of chief engineer and manager of that Department, where he was actively associated with contracts for railways in many countries. He joined the Southern Railway in 1936 as technical assistant to Mr. A. Raworth, then electrical engineer for new works, and while in that position represented the railways on many Government technical committees. Mr. Warder was appointed new works assistant to the chief electrical engineer in 1943 and was primarily concerned with the plans for the future development and reconstruction of the electrified system. In 1946 he was one of a delegation who visited North America to study and report on the development of diesel electric traction and the possibility of its application in this country. He was appointed assistant to the chief electrical engineer in 1947 and became electrical engineer, Southern Region, in January, 1948.

Mr. S. B. Warder

Holophane, Ltd., announce the appointment to their board of **Comte Exelmans,** president and director-general of the Société Anonyme Holophane of Paris, and **Mr. W. T. Souter,** general sales manager of the company. **Dr. S. English,** F.Inst.P., M.I.E.E., technical director of the company, has been appointed a joint managing director.

Mr. L. H. Halling, at present on the South Eastern Area sales staff of High Duty Alloys, Ltd., has been appointed sales area manager for Scotland, Northern Ireland and the three counties of Cumberland, Durham and Northumberland. He will take up his new appointment as from the 1st October and will be based initially at the company's factory at Winscales, Workington, Cumberland. (Telephone: Workington 581).

The General Electric Co., Ltd., announces the retirement of **Mr. R. O. Ackerley,** M.I.E.E., F.I.E.S., manager of the company's Illuminating Engineering Department since 1931. Mr. Ackerley was educated at Eton and won a scholarship to Oxford. During the 1914-1918 war he served with the South Wales Borderers and was awarded the M.C. He joined the G.E.C. in 1919, and from 1919-1924 served with the company in South Africa. He is a past president of the Illuminating Engineering Society and a past chairman of the Utilization Section of the Institution of Electrical Engineers. He represents the Illuminating Engineering Society on the National Codes of Practice Committee, which was set up to formulate technical standards for post-war building. Mr. Ackerley is also a member of the Ministry of Works Post-War Building Committee on Lighting, the National Illumination Committee, the Illumination Industry Committee, and the Gen-

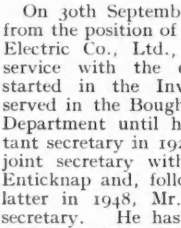
Mr. R. O. Ackerley

eral Council of the British Standards Institution. In 1945 he was awarded the I.E.E. Crompton Premium for a paper on "Some Factors Affecting the Design of Electric Lighting Installations for Building Interiors." He is the author of a recently published book entitled "The Science of Artificial Lighting," as well as other papers prepared for the I.E.E. and the I.E.S.

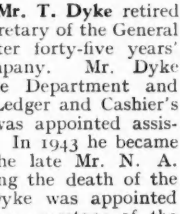
Mr. S. Anderson, B.Sc.(Eng.), Lond., has been appointed chief illuminating engineer to the G.E.C. Mr. Anderson was educated at Bedford School and Faraday House. He gained experience in the generation, distribution and contracting sides of the electrical industry with the County of London Electric Supply Co. and the Yorkshire Electric Power Co. He first turned his attention to lighting in 1929 when he joined the E.L.M.A. Lighting Service Bureau. Mr. Anderson joined the Illuminating Engineering Department of the G.E.C. in 1935.

Mr. S. Anderson

On 30th September **Mr. T. Dyke** retired from the position of secretary of the General Electric Co., Ltd., after forty-five years' service with the company. Mr. Dyke started in the Invoice Department and served in the Bought Ledger and Cashier's Department until he was appointed assistant secretary in 1925. In 1943 he became joint secretary with the late Mr. N. A. Enticknap and, following the death of the latter in 1948, Mr. Dyke was appointed secretary. He has been secretary of the G.E.C. Social and Athletic Club for many years, and of the G.E.C. Pension Fund which has now reached a figure of over £5,000,000.

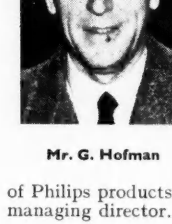


Mr. T. Dyke



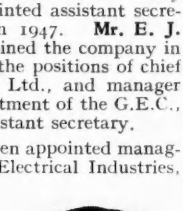
Mr. T. B. O. Kerr

Mr. T. B. O. Kerr has been appointed secretary of the G.E.C. as from 1st October in succession to Mr. Dyke. Mr. Kerr was educated at Uppingham and Wadham College, Oxford, and joined the G.E.C. in 1930. Following a period as outside representative of the Sales Department, he joined the staff of the late Mr. M. J. Railing in 1932, and in 1935 became personal assistant to Sir Harry Railing. He was appointed assistant secretary of the company in 1947. **Mr. E. J. Cutts,** A.C.I.S., who joined the company in 1920 and has occupied the positions of chief accountant of Coldair, Ltd., and manager of the Statistical Department of the G.E.C., has been appointed assistant secretary.



Mr. E. J. Cutts

Mr. S. S. Eriks has been appointed managing director of Philips Electrical Industries, Ltd., the holding company controlling the Philips group of companies in the British Isles. In view of this appointment Mr. Eriks has resigned the position of managing director of Philips Electrical, Ltd., but remains on the board.



Mr. S. S. Eriks

Mr. G. Hofman

Mr. G. Hofman has been elected to the board of Philips Electrical, Ltd., the company handling the sale of Philips products, and has been appointed managing director.

Mr. G. F. Sargent, chief buyer for Electronic Transmission Equipment, Ltd., has severed his connection with the company. His address is 3, Narbonne Avenue, Clapham Common, London, S.W.4.

Professor M. S. Thacker, B.Sc.(Eng.), M.I.E.E., F.Amer. I.E.E., M.Inst.F., F.A.Sc., Head of the Department of Power Engineering and Electrical Technology at the Indian Institute of Science, Bangalore, has taken over the additional duties of acting director of the Institute with effect from 23rd September last. **Mr. E. V. Ganapati Iyer,** the

previous acting director ,is reverting to his permanent post with the Government of H.H. the Maharaja of Mysore.

At the annual conference of the Purchasing Officers' Association held recently at Scarborough, **Mr. T. F. Turner,** of the English Electric Co., Ltd., was elected president, and **Mr. D. Wragg,** of Thomas Firth and John Brown, Ltd., was elected chairman for 1949-50. It was reported at the Conference that the Association now has twenty-four branches and groups, and a membership exceeding 2,000 practising industrial and Governmental purchasing officers.

The British Electricity Authority announces that **Mr. G. F. Peirson,** M.I.E.E., chief engineer, Midlands Electricity Board, and **Mr. T. R. Warren,** M.I.E.E., chief engineer, South East Scotland Electricity Board, have accepted invitations to serve on the recently established Research Advisory Council as the representatives of the Area Electricity Boards.

Mr. C. R. Skinner has now succeeded his father, the late Mr. C. P. Skinner, who died in May last, as managing director of the Elkay Electrical Manufacturing Co., Ltd.

Mr. K. R. Hopkirk, M.A., chief mechanical engineer of the British Thomson-Houston Co., Ltd., has been elected a director of the company.

Contactor Switchgear, Ltd., announce that owing to the increased size of the organization, it has become necessary to extend the board. Accordingly, **Mr. A. V. Lawry,** A.M.I.E.E., and **Mr. C. A. Bradbury,** Associate I.E.E., have been appointed directors, as from 1st October.

Mr. C. H. Goddard, of Sylvania Electric Products, Inc., was elected president of the American Illuminating Engineering Society at the recent National Technical Conference held at French Lick, Indiana, in succession to **Mr. L. E. Tayler** (Detroit Edison Co.).

The meeting of the Council of the **Electrical Wholesalers' Federation,** which is held annually in Scotland at the invitation of the Scottish Section of the Federation, was held recently at Gleneagles. The function has grown in popularity, and this year, in addition to the E.W.F. Council and the chairmen and chief executives of the E.L.M.A. and the R.C.M.A., members of both Negotiating Committees were invited. The day was devoted to golfing competitions, and for those who did not play golf a motor trip to St. Andrews was organized. In the evening, the members of the Scottish Section entertained their visitors to dinner. The toast of the guests was proposed by the Scottish chairman, Mr. W. K. Rennie, and responded to by Mr. W. H. Williams, chairman of E.L.M.A. and Mr. Lewis Smith, chairman of the R.C.M.A. Mr. H. A. Deacon, proposed the health of the ladies, and Mrs. J. M. Hollander, wife of the vice-president, responded. During the function the golfing trophies were presented, the winners of the president's prizes being Mr. J. Bunting (Edison Swan Electric Co.) and Mr. T. Gavin (British Thomson-Houston Co.). The president, Mr. Rutherford, himself won a trophy as runner-up in one of the competitions. After dinner there was dancing.

Mr. A. S. Oldhams, A.M.I.E.E., who until recently has been engineer and manager of the London Branch of the Revo Electric Co., Ltd., has been appointed senior sales executive of the Jackson Electric Stove Co., Ltd.

At the Sun Electrical Company's jubilee celebrations (Porchester Hall, London, 30th September). Left to right: Mr. W. R. Rawlings (director), Mrs. Beaver, Mr. A. G. Beaver (chairman), and Miss V. M. Cresswell, who is making a presentation to Mr. Beaver from the staff

Mr. K. A. Aldridge, lately consumers' engineer in the Redditch District of the Midlands Electricity Board, has taken over the vacancy created by the resignation of **Mr. H. N. Thompson,** of the Birmingham branch of the Jackson Electric Stove Co., Ltd. Mr. Thompson has completed nineteen years with the company and now leaves to join a company outside the electrical industry.

The address of **Mr. M. W. Singer,** M.Sc. (Tech.), M.I.E.E., is now 36, St. Michael's Road, Worthing, Sussex (Telephone: Worthing 4918).

Two young Australians, **Mr. F. St. George Birks** (Lane Cove, N.S.W.) and **Mr. J. M. McEachern** (Randwick, N.S.W.) have been awarded Parkinson Empire Bursaries. The bursaries were created last year as a mem-

orial to the late Mr. Frank Parkinson. They provide for free transport to this country, two years' training with Crompton Parkinson, Ltd., and costs of post-graduate training at an approved university or technological institution in Great Britain.

Mr. Leslie C. Sharp has resigned from the board of Venner Time Switches, Ltd. He intends to continue his personal activities in the corporate life of the industry, notably his honorary work for the Electrical Industries Benevolent Association, of which he is chairman of the Court. Mr. Sharp's private address is Rowbarns Grange, East Horsley, Surrey.

Mr. A. Craven, district engineer at Blyth for the North Eastern Electricity Board, is to retire after forty years with the electrical industry. He joined the old Newcastle Electric Supply Co., Ltd., in 1910. **Mr. A. Pattison,** who is assistant district engineer at South Shields, is to succeed him as district engineer at Blyth.

Mr. and Mrs. E. A. Harvey, of Nottingham, celebrated their golden wedding on 2nd October. Mr. Harvey, an electrical contractor, is a founder member of the Nottingham Branch of the E.C.A.

The **Wessex Wholesale Electric, Ltd.,** recently celebrated the completion of twenty-five years' trading when a dinner was held at Bath at which 150 guests attended. Mr.

The Princess Royal inspecting the "Seascan" radar equipment on the Metrovick stand at Radiolympia. With Her Royal Highness are Mr. J. Nicholson (M.V. London Office) and Mr. V. M. Roberts (chairman, Radio Communication and Electronic Engineering Association)

R. G. Brandon, sales manager, B.T.H. Co., who proposed the toast of the company in the unavoidable absence of Mr. S. V. Wilshire, of Purnell & Sons, Ltd., congratulated the company on its past achievements and wished it success in the future, and Mr. A. Parkinson, sales manager of Crompton Parkinson, in seconding the toast, referred to the expansion of the company which covered a wide field, not only in the West of England, but also in the south and the Midlands. Mr. R. E. Tucker (director), in responding, said that their turnover in the first year had now become the average daily turnover and he paid a tribute to the staff. Mr. A. E. Hayward (director) proposed the toast of "Our Guests," to which Mr. W. H. Sawtell responded.

The silver cup awarded annually by the Association of Supervising Electrical Engineers to the branch with the best all-round record of the year, including educational activities and efficient management of branch affairs is to be presented to the North West London Branch at the presidential address meeting on 18th October at the Lighting Service Bureau, 2, Savoy Hill, London, W.C.2. The runners-up were West London, Central London and South West London, respectively, in order of merit.

Obituary

Mr. H. G. Shoolbred.—The death occurred on 28th September at the age of seventy-eight, of Mr. Henry George Shoolbred, founder and at the time of his death a director of the Shoolbred Electrical Co., Ltd., Luton. Mr. Shoolbred commenced business as an electrical contractor in 1895 at Thanet House, Strand, W.C.2, after completing his electrical training under Professor Silvanus Thomson, who was his first customer. With a partner, Mr. Shoolbred founded the firm of Shoolbred and Connell, in Fleet Street, E.C.4, and in 1901 the firm obtained the contract for the wiring for lighting at the electricity works then being built at Luton. While this work was in progress, Mr. Shoolbred saw the opportunities in the town and opened a branch office there, which later became the major part of the firm's work so that the London office was closed in 1907. The firm was formed into a company in 1930, and Mr. A. Plummer, who had been with Mr. Shoolbred for some years, became managing director.

Mr. William A. Woodeson, who has died at Gosforth, Newcastle-on-Tyne at the age of eighty, was the first chairman of the old Seahouses and District Electric Supply Co., Ltd., Northumberland. For over twenty years Mr. Woodeson had been chairman of Clarke, Chapman & Co., Ltd.

Mr. R. A. Fulford.—The death occurred on 3rd October of Mr. Richard Alfred Fulford, chairman and joint managing director of Marco Refrigerators, Ltd., and a director of Sunvic Controls, Ltd.

Textile Machinery Exhibition

ELECTRICAL EQUIPMENT WELL TO THE FORE

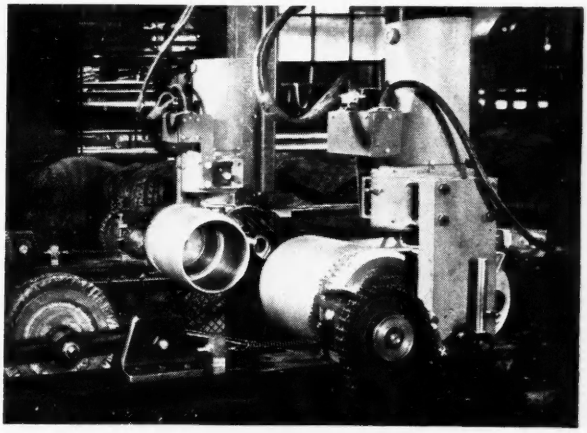
CONSIDERABLE electrical interest is attached to the exhibition of textile machinery and accessories which the *Textile Recorder* is now holding at Belle Vue, Manchester. The many electrical firms participating provide an opportunity for seeing much equipment specially designed to meet the particular requirements of the textile industry, emphasis being placed primarily on compactness and ease of control.

An automatic piling apparatus for handling cloth in the rope form during bleaching operations is one of the latest products of Mather & Platt, Ltd. There is also a three-bowl padding mangle with specially constructed bowls and an interesting method of application of pressure. A clip stentering machine of the jigging type has several modern features, as have also a drying cylinder and a pressed bowl for embossing calenders.

An electronic cloth guiding equipment and overfeed device developed by Ferranti, Ltd., for guiding cloth accurately and rapidly on to pin stentering machines, utilizes a novel wheel-guiding principle under electronic control which responds instantly to any variations in the cloth selvedge, thus ensuring accurate guiding at all speeds. The "eye" of the equipment consists of a photo-electric cell and a lamp fitted in a suitable housing mounted on the guiding arm. The selvedge of the cloth runs between the lamp and the photo-cell in a half-way position so that the light is partly obscured. Lateral variations in the position of the selvedge increase or decrease the amount of light falling on the cell, thus increasing or decreasing the potential generated in the cell. This potential is fed to an electronic amplifier and after amplification the signal is transmitted to the field windings of a special motor geared to the guiding arm. The motor rotates until the photo-cell (and hence the guiding arm) is restored to its original position relative to the cloth.

The overfeed device applies the desired amount of overfeed in a uniform manner by arranging for the overfeed wheel to be driven at such a rate that the surface speed (i.e., the speed at the periphery of the wheel) is greater than the speed of the pin chain on the stenter. The cloth is then placed on the stenter pins with a regular small accumulation between adjacent pins. In consequence the warp shrinkage remains constant throughout the length of the cloth.

On the Carrier Engineering Co.'s stand a ring spinning frame by Platt Brothers (Sales), Ltd., is seen equipped with the latest "Pneumafil" pneumatic undercleaner and broken end collector. In this particular installation, the main "Pneumafil" duct is situated below the level of the roller beam and the individually motor-driven filter box is mounted over

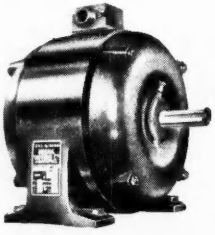


Guider heads and overfeed wheels of Ferranti Mark I guider at a cotton mill

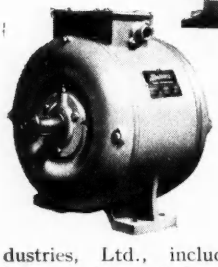
the frame driving motor at the off-end of the machine. Various component parts of the plant, including the suction fan assembly, filter box and flutes are available for inspection in addition to photographs of installations in a number of Lancashire mills. Photographs and descriptive literature of air conditioning installations are also available.

Electric motors and control gear suitable for textile drives are to be seen in great profusion. On the Brook Motors stand there are standard protected, surface cooled and totally enclosed types, together with the Brook patent 4-1 veebelt reduction unit, and totally enclosed loom motors obtainable for normal foot mounting or with spring cradle.

A new automatic direct switching starter, with a rubber-mounted contactor panel, is unaffected by loom vibration and thus overcomes the necessity for fitting the starter away from the loom framework. For spinning frames and similar machines the Brook "Textart" motor is being exhibited, together with a specially designed "Mule" motor. Sectionalized running models of "Cub" fractional h.p., "Empress" capacitor and large slip-ring motors are demonstrated on the company's stand.



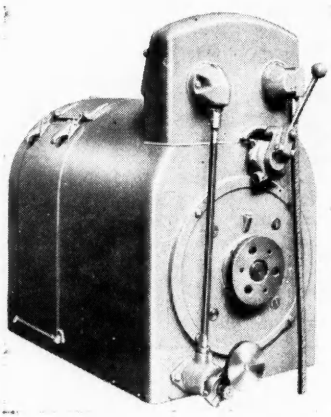
Brook loom motor (right) designed to keep axial length to a minimum



Newman high torque totally enclosed loom motor

A representative range of motors shown by Newman Industries, Ltd., includes a range of loom motors of from ½ to 1½ h.p. running at speeds of 960 r.p.m. and 720 r.p.m. These are totally enclosed, high efficiency, high torque machines and a noteworthy feature is the standardization of fixing dimensions and shaft heights, making all the machines interchangeable. Totally enclosed, squirrel cage, induction motors are available up to 25 h.p. and examples of both foot and flange mounting types are shown. The larger sizes, from 15 h.p. upwards, are of the double cage rotor type, giving exceptionally high starting torque.

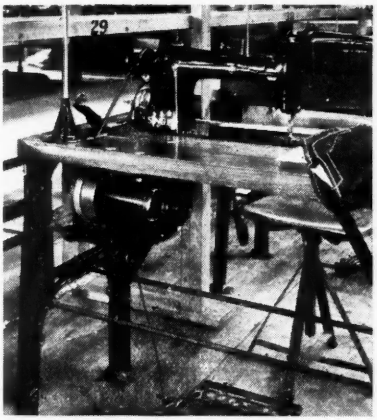
The General Electric Co.'s exhibit covers electric power drives and control



G.E.C. automatic ring spinning frame commutator motor, 6/12 h.p., 600/1,200 r.p.m.

gear, lighting, heating and ventilating, water heating and catering. A ring spinning type motor is to be seen, together with starter, reverser and control gear. Loom motors and controls and flush-fitting floor type distribution boxes can also be examined. A 16in oscillating fan has been specially designed for creel work. Fittings for fluorescent and tungsten lamps are particularly applicable to the textile industry's requirements; of particular interest is a colour-matching unit. A photographic display cabinet shows pictures of textile installations using G.E.C. equipment.

Especially smooth and even acceleration for driving textile machinery is provided by "Textork" a.c. motors, the "Klosd-Textork" (totally enclosed) type being available for applications where screen-protected motors would need frequent interior cleaning to prevent overheating. The makers, Crompton Parkinson, Ltd., are also exhibiting a 5 kW



Crompton Parkinson "Mardrive" unit for the individual driving of industrial sewing machines

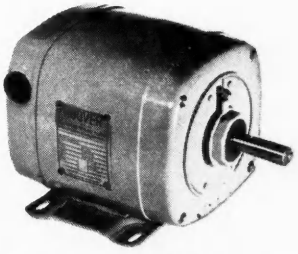
d.c. generator constructed for long periods of operation with the minimum of maintenance and a range of "Minor" fractional h.p. motors, for both a.c. and d.c. A special feature of the brush gear of the "Minor" d.c. types is a spring pressure plate to prevent brush chatter and ensure consistent pressure even under bad working conditions.

The "Mardrive" unit for the individual driving of industrial sewing machines, consisting of a clutch, flywheel and brake assembly, provides for rapid acceleration of the machine head to full speed and stopping within one stitch and saves the high cost of belt maintenance associated with group drives. "Klad A" switchgear is particularly suitable for controlling distribution circuits, etc., in textile mills. "Tong-test" ammeters and a selection of industrial and commercial fluorescent lighting fittings using fluted glass or "Perspex" panels are also included in the display.

For use in all branches of the textile industry, particularly for various machines in the hosiery trade and for various pirn winding equipments, Hoover, Ltd., introduces its new totally enclosed fractional h.p. motors ranging from 1/6 to $\frac{3}{4}$ h.p. three-phase and 1/6 to $\frac{1}{2}$ h.p. single-phase (capacitor or split phase start). The motor conforms to B.S. 170/1939 and Appendix D. The stator, made from high-quality electric steel, has die-cast around it an aluminium alloy casing in which are ample air ducts running parallel to the stator stack in order to assist cooling. On to spigots turned on the casing are fitted the end frames. These are of aluminium alloy and are of extremely rigid design, having strengthening ribs running radially from the centre to the outer casing wall. From the same steel as the stator are stamped the rotor laminations, which when die-cast with pure aluminium to form the conventional squirrel cage structure, are pressed on to a $\frac{7}{8}$in diameter knurled shaft. The shaft extensions for pulleys are either $\frac{5}{8}$ or $\frac{1}{2}$in diameter. The company also displays its range of protected ventilated squirrel-cage motors.

Apart from a typical range of motors particularly applicable to textile installations, including specially developed motors for the individual drive of looms, carding engines, speed frames and ring frames, the Metropolitan-Vickers Electrical Co., Ltd., is showing "Perigrip" (electro-magnetic) brakes for use on warping machines, ring frames and looms, and also a full range of control gear—starters, loom switches, etc.

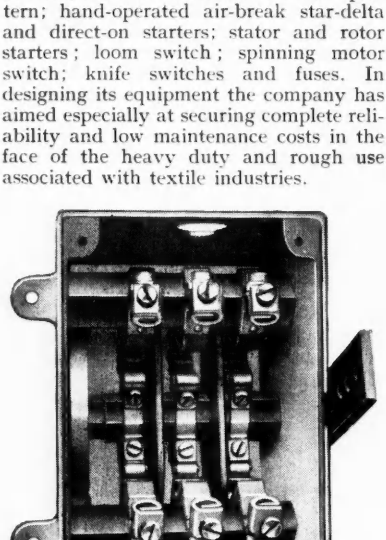
An electronic speed control equipment, applicable to sizing and finishing machines, is fed from an a.c. supply and controls the motor by means of Thyratrons which are in turn controlled by a valveless magnetic amplifier. A $\frac{1}{4}$ h.p. motor maintains constant torque throughout a wide speed range to 2 per cent of the maximum speed at any selected speed. Small items of switchgear and a general display of lighting fittings are also on view.



Hoover totally enclosed f.h.p. motor

On Erskine, Heap & Co.'s stand can be seen a l.v. ironclad switchboard, part

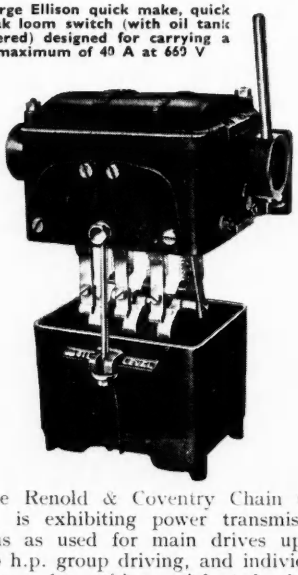
of one being constructed for a large group of Lancashire cotton mills. It comprises OS 22 type oil circuit breakers of exceptionally robust construction. The overload and, where supplied, the no-volt, coils are all under oil, while heavy duty sparking contacts reduce maintenance. Each unit contains its own isolating gear. On another switchboard exhibited are examples of nearly every type manufactured by the company, such as contactor starters, both direct-on and star-delta pattern; hand-operated air-break star-delta and direct-on starters; stator and rotor starters; loom switch; spinning motor switch; knife switches and fuses. In designing its equipment the company has aimed especially at securing complete reliability and low maintenance costs in the face of the heavy duty and rough use associated with textile industries.



Erskine Heap loom switch

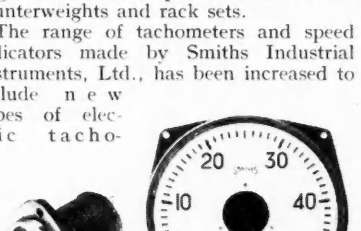
High- and medium-voltage switchboards and a selection of starters for the control of textile machinery are displayed by George Ellison, Ltd. As an example of the 11 kV switchgear a circuit breaker unit and an isolator unit form a ring main unit. A 660 V switchboard includes circuit breakers for maximum current-carrying capacities of 60, 150, 300 and 1,100 A. The complete range of circuit breakers vary from 20 to 3,000 A. Starters for squirrel-cage and slip-ring motors include the "Bantam" for direct-on starting of motors up to 10 h.p. and larger units for controlling motors of up to 1,000 h.p. Of particular interest are non-automatic switches specially designed for the frequent making and breaking of circuits.

George Ellison quick make, quick break loom switch (with oil tank lowered) designed for carrying a maximum of 40 A at 669 V



The Renold & Coventry Chain Co., Ltd., is exhibiting power transmission chains as used for main drives up to 1,250 h.p. group driving, and individual driving of machines. Adapted chains suitable for auxiliary purposes in textile machinery are also shown, together with conveyor and elevator chains. Power transmission accessories include couplings, clutches, speed transformers, counterweights and rack sets.

The range of tachometers and speed indicators made by Smiths Industrial Instruments, Ltd., has been increased to include new types of electric tacho-



Smiths electric tachometers and speed indicators work in conjunction with a generator which is situated close to the source of the drive

meters. These operate in conjunction with a generator at the driving source and are particularly suitable for use where the instrument needs to be remote from the source of drive. Counters, pressure, vacuum and compound gauges, thermometers, process timing clocks and the "Desynn" system of remote indication, are other exhibits.

Among a complete range of automatic temperature regulators exhibited by the Drayton Regulator & Instrument Co., Ltd., are electrically operated regulators with on-off or proportioning action for space heating, heat processing, etc., pressure, temperature and liquid level operated electric switches for various applications, instruments for indicating and recording temperature, pressure and draught; the new type DV3 dye vat regulator; and the new "Telereg" system of proportioning electric control. The last-mentioned equipment includes a powered valve or damper mechanism which may be operated from one or more points.

The stand of Bakelite, Ltd., covers the use in textile machinery of mouldings from "Bakelite" thermosetting powders, laminated sheet, rod and tube, and protective finishes based on synthetic resins. New developments on the Morgan Crucible Co.'s stand include various types of "Morganite" self-lubricating bearings, carbon pump seals and other components.

Products manufactured by Fibreglass, Ltd., from their glass yarns include braided glass sleeving saturated with an insulating varnish.

On the stand of the North Western Electricity Board, which is organized in conjunction with the British Electrical Development Association, is an inquiry bureau staffed by engineers in textile works. The improvement of mill lighting and the advantages to be derived from electric drive taking supply from the mains, is graphically depicted by three-dimensional displays and enlarged photographs. The latest electrical equipment for cooking and water heating in mill canteens is illustrated, and technical literature of special interest to managements contemplating re-equipment of textile works is available. The considerable progress being made in extending the capacity of power stations in the North West is indicated.

The exhibition closes on 22nd October.

Sign Manufacturers

TO meet the increased amount of work in the sphere of town and country planning the Electrical Sign Manufacturers' Association has decided to reorganize and enlarge its secretariat.

Mr. Felix A. Rogers, M.B.E. (B.E.A.M.A.), who has been part-time secretary since April, 1948, has been appointed honorary director and will not now be concerned with the day-to-day activities although he will continue to be available for consultation.

To succeed Mr. Rogers as secretary the Association has appointed Mr. Bernard Moss, M.A., LL.B. (Cantab). Mr. Moss, who is a barrister, was previously assistant secretary to the Federation of Civil Engineering Contractors and before that was on the legal staff of the Kent County Council.

Part of the new secretary's work will be to advise on, and conduct appeals under the advertisement regulations on behalf of members of the Association. He will also assist the Outdoor Advertising Industry Advisory Committee in its work of endeavouring to ensure that Orders creating areas of special control are not made against the interests of the industry.

Manchester E.I.B.A. Ball

THE first Charity Ball held by the Manchester and District Branch of the Electrical Industries Benevolent Association was so enjoyable and successful, resulting in a substantial contribution to E.I.B.A. funds, that a second ball is being organized. This will again be held in the Alexandra Ballroom of the Midland Hotel, Manchester, on 2nd December.

Single tickets (45s each) are now available. They can be obtained from the following members of the Ball Sub-Committee: Messrs. C. T. S. Arnett (B.E.A.), G. A. Cheetham (Ferguson Pailin), R. A. Erskine (Erskine, Heap & Co.), S. Ferguson (Cooke & Ferguson), C. J. Fox (W. J. Furse & Co.), J. B. Hartley and A. C. Ellis (deputy) (Metropolitan - Vickers), O. Howarth and J. E. Peters (deputy) (N.W. Electricity Board), T. Smalley (Dorman & Smith), H. Cobden Turner, J.P. (chairman) (Salford Electrical Instruments), A. H. Owen (treasurer), 11, Albert Square, Manchester, A. Wadsworth and C. S. Wallbridge (joint hon. secretaries) (Salford Electrical Instruments).

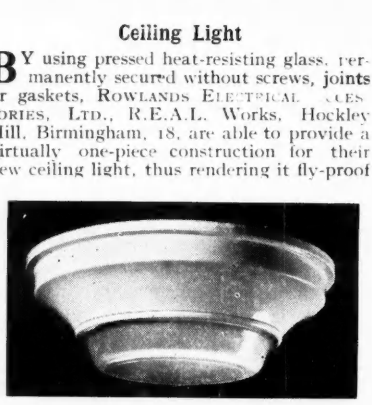
The reception is timed for 7.15 p.m., the dinner for 8 p.m., and there will be dancing until 1 a.m. Much of the success of the first ball was due to those who, though unable to be present, made contributions in cash, vouchers and presents.

RECENT INTRODUCTIONS

Notes On New Electrical and Allied Products

Ceiling Light

BY using pressed heat-resisting glass, permanently secured without screws, joints or gaskets, ROWLANDS ELECTRICAL ACCESSORIES, LTD., R.E.A.L. Works, Hockley Hill, Birmingham, 18, are able to provide a virtually one-piece construction for their new ceiling light, thus rendering it fly-proof and dust-proof. The entire body is produced from one piece of metal and the provision of a separate back or mounting plate does away with all outside fixing screws or catches, the exterior of the fitting being therefore quite plain and readily cleaned. The unit is fixed to the mounting plate by three spring-loaded bayonet catches and is easily removable for re-lamping. No ventilation is needed as overall dimensions have been carefully calculated to avoid any undue temperature rise. Accurate location of the lamp obviates ceiling black-out.



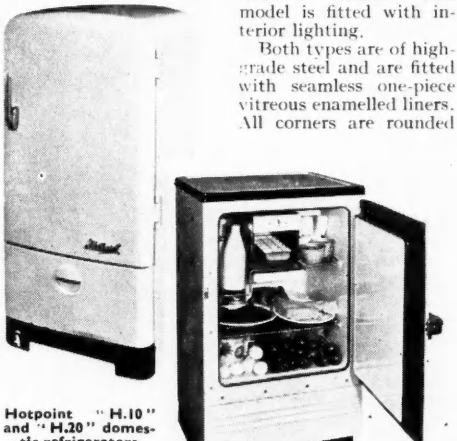
R.E.A.L. one-piece metal ceiling light

A 9⅝in diameter model accommodating a 60 W lamp sells at 24s, plus purchase tax; a 12in type for a 100 W lamp is priced at 32s, plus purchase tax. The standard colour is "off-white," but other colours or special finishes can be supplied to order.

Domestic Refrigerators

The HOTPOINT ELECTRIC APPLIANCE CO., LTD., Crown House, Aldwych, W.C.2, is entering the domestic refrigeration field with two models. The H.10, priced at £49 15s, plus £12 18s 8d purchase tax, is a table-top type with 3 cu ft storage capacity. Fitted with an almost silent hermetically sealed refrigerator system which requires neither oiling nor maintenance, it is very compact and takes up the minimum of space. The cabinet is so designed that the maximum amount of food can be stored on two removable shelves, the top one being stepped to accommodate quart bottles of milk. A chiller dish is provided together with a spacious stainless steel freezer with ice tray yielding 1½ lb of ice cubes per freezing.

The H.20, priced at £69 plus £17 18s 10d purchase tax, has a net storage capacity of 4·5 cu ft. A five-compartment model, it has three removable shelves, the top one being stepped; a large stainless steel freezer with two ice trays yielding 4 lb of ice per freezing; a deep chiller dish and cover; and a spacious salad compartment with cover. A further feature is the capacious non-refrigerated bins at the base of the refrigerator where vegetables can be stored. This model is fitted with interior lighting.



Hotpoint "H.10" and "H.20" domestic refrigerators

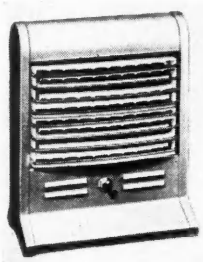
Both types are of high-grade steel and are fitted with seamless one-piece vitreous enamelled liners. All corners are rounded for easy cleaning. Shelves are of steel hot-dip tinned, and the freezers are of easy-clean non-corrosive stainless steel. A single-

knob control system provides thermostatically the cabinet temperature, the defrosting position and the on/off running positions. Full protection of the mechanism is provided if a fault occurs and there is no interference with radio or television.

The refrigerators, which are designed for a.c. only, consume less than a unit of electricity a day. Both models are sold with a twelve months' guarantee, and the company is ensuring adequate servicing.

Portable Fires

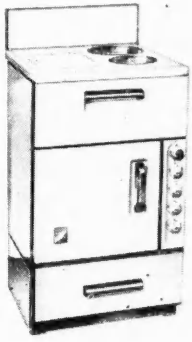
Two attractive portable fires introduced into the range of apparatus supplied by BRITISH NATIONAL ELECTRICS, LTD., Newarthill, Motherwell, are designed to give both radiant and convection heating. They are of robust pressed steel construction and are finished in florentine bronze. The curved refractory bar type elements are protected by dull plated wire guards. The 1 kW model (F.101), weighing 7 lb and measuring 10½in high, 11in wide and 6in deep, costs £1 10s, plus purchase tax. The 2 kW unit (F.102), which has one bar controlled by a foot switch, weighs 9½ lb. is 3in taller and sells at £2 5s, plus tax.



B.N.E. 2 kW portable fire

Medium-sized Cooker

To meet the demand for a medium-sized cooker the REVO ELECTRIC CO., LTD., Tipton, Staffs, has produced a further version of the "Princess" model. The "463" possesses a body and oven of the same dimensions as the original "461" but the hob has been redesigned to incorporate an additional boiling plate, 6¼in in diameter loaded at 1 kW. Finisher in grey or green and cream vitreous enamel, it costs £26 with a flush plinth at the base or £29 with a heated drawer substituted.



Revo 'Princess 463" cooker

Shop Window Lighting Unit

The "Windolux" unit has been specially designed by SCEMCO, LTD., 6-7, Soho Street, London, W.1, to meet the increasing demand for shop-window lighting. It is so constructed that it will fit any corner and can be fitted if required to the ceiling of the window to give a wide dispersal of light. The control gear is self-contained and is easily accessible. The reflectors can be removed for cleaning and to expose control gear without removing the main fitting. The unit is made in the following sizes: Twin 2ft 40 W lamps, twin 3ft 30 W lamps, single and twin 4ft 40 W lamps and single and twin 5ft 80 W lamps. The fitting illustrated has a single 4ft 40 W lamp and has a list price of £4 17s 6d, plus 3s 3d purchase tax on the lamp.

'Windolux" shop window lighting unit

A Neat Bell

The "Disc-o-Bell" has been designed by GENT & CO., LTD., Faraday Works, Leicester, to meet the demands for a bell somewhat larger than the small conventional type without resorting to the larger metal-clad industrial pattern. Neat in appearance, it projects only 1⅝in from the surface when fixed and has an overall diameter of 8in (7in gong). Its distinctive tone cannot be confused with that of other types of bell. The bronze finish blends well with any surroundings. The standard type operates on 4½ V d.c. (a flat pocket torch battery can be accommodated inside) or 12 V a.c., but 12 V, 24 V and 36 V d.c. models are also available. In each case the price is 32s 6d

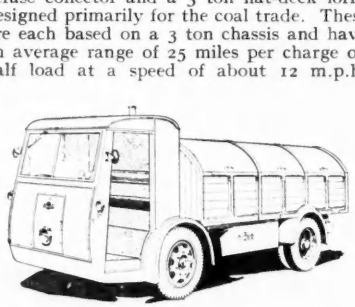
A "Disc-o-Bell"

Three New Battery Vehicles

AUSTIN CROMPTON PARKINSON ELECTRIC VEHICLES, LTD., Longbridge, Birmingham, have just added three new models to their

range of 10-, 20- and 40-cwt electric vehicles. For known delivery rounds where speed and range are not of paramount importance the "12-18" model, embodying the standard Morrison-Electricar 10 cwt chassis but with smaller capacity batteries, has a low initial cost and a load-carrying capacity varying from 12 to 18 cwt, according to the battery employed. There are seven battery capacities available for speeds of 8 to 10 m.p.h. and journeys of between 16 and 44 miles per charge. Standard Morrison-Electricar bodywork provides ease of entry to and egress from the cab, full driver protection, and body ventilation to suit milk and bread deliveries.

The two other new vehicles are an 8 cu yd refuse collector and a 3 ton flat-deck lorry designed primarily for the coal trade. These are each based on a 3 ton chassis and have an average range of 25 miles per charge on half load at a speed of about 12 m.p.h



The Morrison-Electricar 8 cu yd refuse collection vehicle which has just been introduced

The body of the refuse collector has three curved sliding steel shutters on either side and is supplied with hydraulic end-tipping gear. Centre-opening rear doors are fitted and the full-width cab will accommodate four men easily.

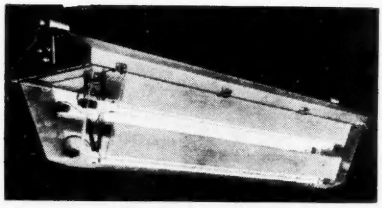
Fluorescent Street Lighting Lantern

In a three-lamp fluorescent lantern introduced by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, at this year's conference of the Association of Public Lighting Engineers at Llandudno, light is controlled by a refractor system instead of by the more usual polished reflectors.

The trough forming the lamp enclosure and the four refractor plates are made of "Perspex." The lamps are arranged in a "V" formation, two at the top and one below, and the prism action in conjunction with direct vision of the lamps makes the lantern appear uniformly bright when viewed from all angles up to about 80 deg from the downward vertical.

Dark lines have been avoided by arranging for the back faces of the prisms on the upper plates to be flashed by the reflection of the upper lamps in horizontal reflectors at the top of the lantern, the backs of the lower prisms being flashed directly by the upper lamps.

Peak intensity is at about 75 deg to the



G.E.C. fluorescent street lighting lantern

downward vertical and is well maintained up to 85 deg, while distribution at 45 deg is helped by the reflection of all three lamps from the top reflectors.

The trough is hinged along one edge so that it can be swung open for cleaning and the control gear trays, also hinged, are situated inside the lantern body above the reflectors. The body structure consists of a steel framework covered with aluminium sheet.

Improved Battery Vent Plug

Attractive new cream-coloured polystyrene vent plugs are now being fitted by the CHLORIDE ELECTRICAL STORAGE CO., LTD., Clifton Junction, Manchester, to all "Exide" batteries. They are lighter but much less brittle than those made of porcelain, and are thus better able to stand up to service conditions. Internal baffles return all acid spray to the cell, with provision for the free passage of gases, horizontal outlets avoiding clogging with dirt.

Heat Meter for Irons

For the repair of thermostatic irons EASIPOWER, LTD., 213-5, Gloucester Place, London, N.W.1, has brought out a heat meter. It is suitable for any make of iron and incorporates a warning pilot light for circuit controls. The price is £5 10s.

Easipower heat meter for irons

Views on the News

By REFLECTOR

SHAREHOLDERS of a company like the General Electric Co., obtain some idea of the nature and progress of the business from the report and the chairman's speech at the annual meeting. But reports are necessarily brief, the chairman can touch only upon the "high lights" and all shareholders cannot attend the meeting. In the case of the G.E.C. these handicaps are overcome by the presentation to each shareholder of a handsome illustrated brochure, "G.E.C.: The Complete Electrical Manufacturing Unit," which describes in an interesting fashion the wide range of the activities of the company and its associates. The practice is one to be commended.

★ ★ ★

Mr. G. C. Chelioti, a director of the General Electric Co., Ltd., caused quite a stir by suggesting in an address to a Business Management Institute in the United States that the accounts of British workers' all-out effort during the war were a "legend." Even if this were true it is one of those things that were better left unsaid. The view was a purely personal one and it is not surprising that Mr. Chelioti's fellow directors have hastened to dissociate themselves from it.

★ ★ ☆

To judge by many reports, letters and comments in the Press the Electricity Boards are the natural enemies of the public—always charging too much, wrapped in cocoons of red tape and not at all anxious to please. It comes as a relief therefore to see the Eastern Electricity Board referred to in extremely affectionate terms in a letter in the *East Anglian Daily Times*. The letter raises the popular underground and overhead argument in relation to electricity supply at Kersey. The writer says: "We all love our E.E.B. and would submit to them the following plea"—which, briefly, is that the Board should "off its own bat" put its lines underground. If the added expense is too great the suppliant may feel the pangs of unrequited love.

★ ★ ★

One of the B.E.A. Divisional staff magazines was recently attacked by misogynists for publishing instructions for knitting a baby's "coatee." Another staff magazine, *South-Western Electricity*, is likely to draw the fire of temperance reformers for publishing in its September issue on article on "Making Modern Mead." The justification for this, however, is that the establishment described employs electric heating and processing equipment. This issue, apart from other interesting articles, has a very attractive cover.

★ ★ ★

In the October *Electrical Contractor*, Mr. D. C. Mallam mentions that a fire brigade in the Midlands carries out much of its building work by direct labour. Its activities include installation of hot and cold water and electrical installations. The work may be done very well, of course, but I cannot help recalling that fire experts are prone to suggest electrical origins for outbreaks of fire.

★ ★ ★

Once upon a time on nearly every railway station there stood a machine bearing the inscription "Electricity is Life." A penny was inserted in a slot, two handles were grasped and the patron received a mild electric shock. I am reminded of these machines by seeing a note in the *Northamptonshire Evening Telegraph* about a man who surely must have been a regular customer. Now, unable to find a shocking machine, he obtains his daily dose of electricity by sitting on an electric fence and clasping it with both hands. Or so he says: but as the fence is "electrified" by a 6 V battery and electric fences are hardly suitable seats he must find it very difficult.

★ ★ ★

Rather unexpectedly, the B.E.A.'s advertisement "Use Electricity—Off Peak!" has appeared in abbreviated form in the Personal column of *The Times*. I am sure that it was quite by accident that the advertisement in last Saturday's issue was followed by one beginning: "Wanted. Copies of 'Red Tape Notwithstanding.'"

Exports to Canada

CONTROL GEAR FOR MACHINE TOOLS

SHORT tours of selected industrial areas are being sponsored by the Ministry of Supply (Information Division) to enable London correspondents of the Canadian Press and visiting Canadian journalists to form a clearer idea of the difficulties encountered, the successes achieved and the efforts being made by manufacturers interested in the Canadian market.

The third of these tours, in the north-western region last week, included (in two days) visits to a textile mill and four engineering works, two of them electrical. One of the latter was the factory of Brookhirst Switchgear, Ltd., founded in Chester in 1899 by the late uncle of Mr. Allen Hirst, joint managing director (sales).

The 1,300 employees is a large number for a company confining itself exclusively to the manufacture of control gear for motors, d.c. and a.c., from fractional h.p. sizes upward in a wide range of standard types. The company specializes in co-ordinated group drives with sequence interlocking for material-handling plant, steam raising auxiliaries in power stations and ships' equipment.

Indirect Sales

The factory has 1,750,000 sq ft of floor space, to which 45,000 sq ft will be added by a two-storey extension for which the steel framework is now being erected. The greater proportion of its products goes direct to makers in this country of motor-driven machinery for subsequent re-sale at home and abroad as part of complete contracts.

Export sales are thus largely indirect, but they must exceed one-quarter of the factory output, while gear supplied for control of machine tools represents a substantial part of the company's business. It has specialized in this sphere for many years and has orders in hand now for equipping machine tools which are to be displayed in the Machine Tool Exhibition in Canada in June, 1950.

From the point of view of control gear manufacturers, the Canadian Standard requirements, although basically similar to the British equivalents with regard to safeguarding both machine and its operator, are not the same in detailed application, especially in respect of voltage-to-earth clearances. The differences must involve makers of control gear in considerable re-design work to enable British equipment to comply with the relevant Canadian Specifications. A British mission (including Mr. J. O. Knowles, chairman of the company) sails this week for discussions with Canadian officials on the subject.

The Ministry's guests also toured the Helsby Works (Mr. A. Sargent, managing director) of British Insulated Callender's Cables , Ltd., whose export sales in 1948 were valued at £10,000,000, exceeding by 86 per cent the 1947 total. Although the merged companies' overseas business is almost world-wide, Canada has been excluded since cable-making plants were established there. Capacitors also ceased to be supplied when the agency through which they were sold lapsed at the outbreak of war.

In June of this year a mission of senior engineers was sent to Canada by the company to assess the potential market there for its products and it is hoped that the efforts of the mission sailing this month will lead to the resumption of exports to that country.

Apprentice Training

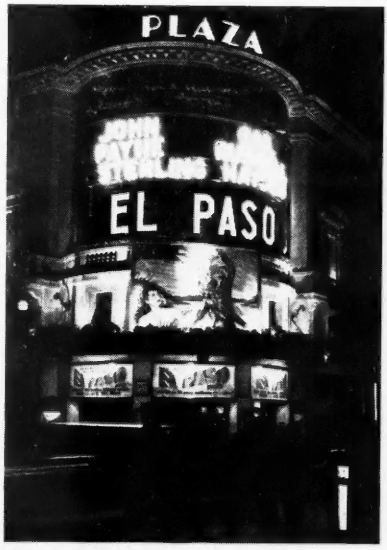
THE importance of providing adequate training facilities for engineering apprentices is obvious to all and in view of the pressing need for reinforcing the ranks of technical personnel the English Electric Co., Ltd., Queen's House, Kingsway, London, W.C.2, has issued a 36-page brochure which outlines its activities in that direction. It explains to the young man what sort of career is open to him with the company and by means of numerous well-chosen illustrations indicates the kind of work upon which he may be engaged at various stages during his training period. Apart from this it discusses the different types of apprenticeship which are available and shows that the company's employees are well cared for both during and outside working hours. This brochure is entitled "The Call for Skill and Ability in the English Electric Co., Ltd."

Exterior Theatre Lighting

Preparation for the Darker Evenings

ALTHOUGH the reimposition on 29th October of the restrictions on advertising and display lighting between 7 a.m. and 7 p.m. unfortunately detracts somewhat from its value, most theatres and cinemas now have at least a partial installation completed in readiness for the darker evenings.

The removal of the restrictions on 2nd April caught most theatres unprepared and there was a rush to get their old installations renovated or new installations completed in time for "lights up." That so many succeeded speaks well for the organization and diligence of the lighting contractors concerned. Since then, all through the summer, further installations have been steadily carried out.



This, and the picture above, show two examples of exterior cinema lighting in London

Details of some of the work undertaken have been given to us by the Strand Electric & Engineering Co., Ltd., who specialize in all classes of illumination connected with amusements. At the moment this company is restricting its installations to the name of the theatre and interchangeable letter signs, leaving outlining, etc., of the theatre until later. Most of the letter signs used comprise neon or fluorescent tubes, but in quite a number of instances small tungsten lamps operated on a 14 V supply through a step-down transformer are asked for. The letters, which are supplied on a hire basis, are available in several sizes in various colours. In most cases it is found necessary to replace pre-war installations entirely.

One of the first post-war jobs to be undertaken was at the Hippodrome, Gloucester, where, thanks to the foresight of the management, the installation was completed some months before the restrictions were relaxed. Within a fortnight of the removal of the ban the Carlton, Plaza, Pavilion, Vaudeville, Globe, Warner's and other theatres in London were all illuminated. One specially interesting rush job was at the Pavilion where, in preparation for the première of "Joan of Arc," 1,000ft of tube was made and installed in three days, by working day and night. Since then the Dominion, New

Victoria, Tivoli, Olympia and many other places have been dealt with.

A fair amount of under-canopy lighting has also been carried out with cold cathode tube in white or colour. Floodlighting installations have been restricted so far by a shortage of equipment, but several schemes are planned as this becomes available.

During the war the company's sign department was kept going on the production of non-illuminated signs. Since the lighting restrictions were removed considerable extensions have been carried out to the factory accommodation and a quantity of new machinery has been installed to cope with the increasing business.

Responsibility for Scaffolding

Extent of Contractors' Liability

By F. E. SUGDEN,
A.C.I.S., Barrister-at-Law

WITH the lifting of the ban on outdoor illuminations and lighting for advertisement purposes many electrical contractors are being asked to put into working order equipment long out of use. At the same time the interior lighting of many lofty buildings, including churches, etc., is being improved, and in the case of bombed buildings renewed. The work is often carried out as a part of general renovation, repair or decoration and scaffolding erected for these purposes is left in buildings for the electricians' use.

This is quite good up to a point, but a new risk arises from it, that is, accidents arising as a consequence of scaffolding not having been erected securely by another contractor. In such cases, what is the legal position of the employee of the electrical contractor who meets with an accident, and what steps should the contractor take to avoid liability?

A case involving scaffolding was recently before the courts. An electrical welder had been employed for some months in welding strips of steel on the ribs of a boat in dry dock. The contractors (to whom the welder's employers were sub-contractors) had provided a staging on which the welder could stand, comprising four boards, 5ft apart, each about 20ft long by 11in wide and 3in deep, supported on 3½ by 3in angle-irons on which he worked at a considerable height. The only means of getting from one board to another was by stepping on to an angle-iron. When handing a tool-box to a fellow welder on an adjoining board the welder put one foot on the angle-iron, slipped and fell astride the angle-iron, sustaining injuries.

In an action by the welder for damages for negligence against the contractor the Court held that the duty owed by the contractor as an "invitor" to the welder as "invitee" was to prevent damage from unusual danger, that is, a danger unusual from the point of view of the particular invitee and not appreciated by him, acting reasonably and exercising due care for his safety, in the circumstances in which he was availing himself of the invitation. The welder had been engaged in similar work all his life and had worked on the staging for some weeks before the accident, using the angle-iron when stepping from one board to another. The danger, therefore, was known to him and was one usual in his daily work. It was immaterial whether or not he had freely and voluntarily, expressly or impliedly, agreed to incur that danger, and consequently, he could not succeed against his employer.

Although in this case judgment was in favour of the employer it draws attention to the fact that it is very important that a contractor should safeguard himself against liability for injury to his employees.

If any liability arises it will be a Common Law liability. If an electrical contractor makes use of scaffolding erected by a fellow contractor who, out of the goodness of his heart or by arrangement, allows him to use the scaffolding erected for some other workmen, then it is the duty of the electrical contractor to make sure that that scaffolding is safe for his

own workmen. It is not sufficient for the contractor who erected the scaffolding in the first instance to give an assurance of its safety. The electrical contractor should himself, or through his foreman or other responsible official, closely examine the scaffolding to make sure it is perfectly safe before any of his own men proceed to work on it. Otherwise, he is liable for negligence and under Common Law liability may find himself having to pay several hundreds of pounds to the employee or his dependants.

It may be thought that the contractors' liability is covered by National Insurance, but this is not necessarily the case. The employee has the right to proceed under Common Law as the payment under National Insurance may be less than what the employee would obtain at Common Law.

No doubt the contractor will have his employees insured against this Common Law liability, but if there are too many claims or very heavy claims, then the insurance company may increase its premium to cover this undue risk.

Mr. Justice Lynskey has stated that an "invitee," using reasonable care for his own safety, is entitled to expect that the occupier shall for his part use reasonable care to prevent damage from unusual danger, which he knows or ought to know about; and that, where there is evidence of neglect, the questions whether such reasonable care has been taken, by notice, lighting, guarding or otherwise, and whether there was contributory negligence on the part of the sufferer, must be determined before liability can be fixed.

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents

Contractors as Advisers

THERE is one aspect of B.E.A. policy which may well escape attention, and I think it is important that it should be brought out—hence this letter.

It may well be that a contractor is asked to investigate and to deal with the question of a d.c. to a.c. change-over, or to check a proposed standing charge on a two-part tariff. There seems evidence that the Area Boards "require" consumers to make direct contact with them on such matters, and the contractor would appear to have no status in the eyes of the Boards. The ready co-operation that the officers of this company have had from the personnel of various Area Boards does not alter the fundamental fact that, if the policy indicated is pursued, then the contractor's position is being undermined.

The consumer should be encouraged to regard his contractor as his agent and interpreter in electro-technical matters, and I would like to see the B.E.A. invited to express an opinion as to whether it would prefer it this way or whether it would rather have direct contact with the consumer.

It is necessary, in my view, that the Boards should recognize the status of the electrical contractor, but no less necessary is it for the contractor to justify that status by giving to his customers a comprehensive consumer service.

J. MORTIMER HAWKINS,
Managing Director,
Mortimer, Gall & Co., Ltd.
*London, E.C.*4.

Delivery Promises

I HAVE just received a quotation which states "Delivery forecast 10 weeks." How refreshingly honest compared with the usual "Delivery 8-10 weeks" which is usually intended for 10 weeks and is frequently exceeded.

C. A. BAKER (M.P.O.A.).

Dearer Tynemouth Lighting

Tynemouth Corporation has been notified by the North Eastern Electricity Board of amended charges for street lighting. It is reported that the present scale for full lighting is £3,405 per annum, whereas from 31st March next, under the new scale, the annual charge would be £4,719.

International Tariff Agreement

RESULTS OF MULTILATERAL NEGOTIATIONS AT ANNECY

BRITISH electrical manufacturers will benefit to a limited extent by multilateral tariff negotiations which took place this year at Annecy and which now form the subject of White Papers (Cmd. 7790-2). The complete tariff schedules are also obtainable from H.M. Stationery Office and reference copies have been distributed to the principal Chambers of Commerce and the regional offices of the Federation of British Industries.

Ten further countries, Denmark, the Dominican Republic, Finland, Greece, Haiti, Italy, Liberia, Nicaragua, Sweden and Uruguay have applied to accede to the General Agreement on Tariffs and Trade made at Geneva two years ago by twenty-three countries. The principal effect of the two agreements on world trade is the lifting of quotas, the United States hitherto being almost the only country whose tariff reductions have been allowed to operate free from the impediment of quotas.

The twenty-three countries which took part in the Geneva negotiations did not negotiate amongst each other at Annecy (except that the United Kingdom and Norway completed negotiations commenced at Geneva) and their negotiations were only with the ten new countries, who also negotiated between themselves. Altogether 147 agreements were completed, the results of which appear in the twenty-eight schedules of tariff rates now made public.

The tariff schedules record the concessions the various countries are prepared to make. In the case of the United Kingdom and most of the other countries approval of the national legislature is necessary and alterations in existing rates of duty will not be made before 1st January, 1950. Provision is made for contracting parties to withhold particular concessions in the event of countries with which they were negotiated not acceding to the General Agreement.

In general the concessions obtained by the United Kingdom, on trade valued in 1938 at about £22 million, relate to manufactured goods (which are of course vulnerable to demands for increased protection arising from the development of local industry), whereas a very large proportion of the value of trade covered by concessions made by the United Kingdom (£79.3 million in 1938) is represented by raw materials. Not all the modifications involve the introduction of lower tariffs; some convert tariffs from a specific to an *ad valorem* basis, while others give an undertaking not to increase tariffs above certain levels or merely confirm previous negotiations.

Plans for the holding of a third round of similar multilateral negotiations are under consideration for 1950 in order to extend the scope of the existing agreements and to allow further countries the opportunity of joining and securing the benefits of the General Agreement on Tariffs and Trade.

Progress in Lighting

Presidential Address to Illuminating Engineering Society

THE evolutionary process that had controlled development in the several branches of illuminating engineering was traced by Dr. J. N. Aldington (Siemens Electric Lamps and Supplies, Ltd.) in his presidential address to the Illuminating Engineering Society this week.

He commenced with observations on the ways in which study of the behaviour of the human eye and of the physiology of vision were leading to one of the new horizons which members of the I.E.S. were seeking to comprehend.

He next explained how wide was the gap between the theoretical maximum 621 lumens/W efficiency of an electrical source of light and those of existing lamps. Each of the four historic types of tungsten lamp was still being made; was there scope for combining all their advantages in a single filament lamp? The use of rarer filling gases indicated the possibility that 75 lumens/W might be reached with discharge lamps. The newer phosphors had enabled the theoretical maximum of about 66 lumens/W to be approached with fluorescent tubes; material rise of efficiency was unlikely to be gained without some sacrifice of colour rendering properties.

Comment on the design of fittings and the need for re-education on the benefit of proper lighting in the home was followed by reference to economic limitations, which necessitated careful budgeting and, as a rule, resulted in compromise. Nevertheless illuminating engineers were urged to press the urgency of the need to improve standards of lighting.

NEW BOOKS

Lighting Technique. By B. F. Fedorov. Translated from the Russian by W. R. Stoker with additional section by W. T. O'Dea, B.Sc., A.M.I.E.E. Pp. 299; figs. 128; index. Hutchinson's Scientific and Technical Publications, Stratford Place, W.1. Price 25s.

This book presents an excellent account of the state of illuminating engineering in the Soviet Union to-day and it is interesting to compare the methods and apparatus described with those current in this country. The efficiencies of filament lamps are some 5 to 10 per cent below those specified in B.S.161 and the difference is still greater in the case of discharge lamps. Similarly, in the tables of recommended values of illumination the figures are generally considerably below those in the I.E.S. Code. However, it is always possible to learn something from a study of practice in other countries and, not unexpectedly, there is a long chapter with an excellent and detailed account of the standards to be aimed at and methods suitable for use in lighting industrial premises, mines, schools, etc.

The translation and production are excellent and twenty pages have been added on fluorescent and other discharge lamps, though nearly four of these are devoted to a comparison of the costs of lighting by fluorescent and tungsten lamps. Unfortunately the bibliography is useless to an English reader and the translator's note does nothing to mend matters.—J. W. T. W.

Business Methods and Organization for Heating, Ventilating, Electrical Engineers and Contractors. By Arthur W. Hopkins, A.A.C.C.A., A.T.I.I., with technical notes by J. J. Sanders. (71 pp.) Ken-Pax Publishing Co., Ltd., Kingsway Hall, London, W.C.2. Price 12s 6d.

Since the "classics" of H. R. Taunton and the late Howard Marryat went out of print there has been a lack of guidance for electrical contractors in the financial and organizational side of their business. This book will serve as a stop-gap until something more comprehensive becomes available.

Most of the matters dealt with by Mr. Hopkins are common to all the industries mentioned in his rather lengthy title and it will repay the electrical contractor to read and act upon much of the advice given, although those in a small way of business may find it too much for them.

The author covers estimating, with special attention to overheads and on-costs, which many contractors guess at rather than determine and allocate correctly; office organization; records; costing and job control; materials and stores control; personnel and labour problems; and taxation. He concludes with some examples of financial statements.

If a contractor finds that all this is too elaborate for his own business he may yet derive useful tips by the way.—J. H. C.

The Fundamentals of Gas Turbine Technology. By W. R. Thomson, B.Sc. Tech., A.M.Inst.C.E. Pp. 148; figs. 117; index. Power Jets (Research & Development), Ltd., 25, Green Street, London, W.1. Price 25s, postage 1s extra.

This book was written for use at the Lutterworth gas turbine school of Power Jets (Research & Development), Ltd., and forms the basis of the theoretical instruction leading up to the testing of gas turbines and to the more specialized information regarding the design and operation of the various components. It is well written and contains much useful information and formulæ.—R. P.

Microwaves and Radar Electronics. By E. C. Pollard and J. M. Sturtevant. Pp. 426; figs. and index. Chapman & Hall Ltd., 37, Essex Street, London, W.C.2. Price 30s. in U.K.

This American book has been written to allow advanced undergraduates and junior graduates in physics and engineering to obtain a knowledge of the wartime advances in pulse and u.h.f. technique sufficient to give an understanding of the way in which these advances will be used

in both fundamental physics and engineering. The authors are a physicist and a chemist respectively and their knowledge of radar was gained during the war in the Radiation Laboratory of the Massachusetts Institute of Technology.

The book is fairly conventional, the first four chapters dealing with electromagnetic waves, their generation, transmission and utilization. Chapters 5 to 8 and chapter 10 deal with circuitry. Chapter 9 is on servo systems, while chapters 11, 12 and 13 are on radar, microwave communications and microwaves in physical research. It is the last two chapters, about 45 pages, which differentiate the book from other introductions to radar.

This volume provides a good general impression of radar systems and the design principles employed. It seems regrettable that, if the emphasis is to be on the future rather than on the past, the accounts of the u.h.f. valves should be so sketchy and that the section on crystals does not deal with semi-conductor properties. The latter field is surely one of the most active in present day physics. The sections on particle accelerators do not present a realistic picture of progress in this field. However, the book is interesting and well illustrated and should arouse the reader's interest enough to make him investigate the subject further.—A. H. B.

The Principles of Electrodeposition. By S. Field, A.R.C.Sc. Pp. 340; figs. 89; index (second edition). Sir Isaac Pitman & Sons Ltd., Parker Street, Kingsway, London, W.C.2. Price 25s.

The second edition of this book should be welcomed by all who extend their interest to the underlying fundamental principles of plating and similar electrochemical processes. The author, who was for many years the head of the Chemistry Department of the Northampton Polytechnic, has devoted the greater part of his life to developing a logical system of teaching the "art" and "science" of electrodeposition. For his students, mainly young people working in industry, he used a simple and lucid style. This book, also, is written in the same simple style and can be read with equal facility by those with little or no initial knowledge of chemistry or electricity.

After dealing with qualitative and quantitative electrolysis, the author devotes a number of chapters to electrolytic conductance, dissociation and the transport numbers of ions in solution. In these he clearly shows how the behaviour of substances in solution parallels that of gas molecules, and how with both gases and solutions, their properties can be deduced from the simplest applications of atomic and molecular theory. In this way he gives a simple picture of the fundamentals of electro-chemistry. Other chapters deal with the relations between thermal and electrical energy, with electrode potentials, accumulators, pH and throwing power of plating solutions.

The book as a whole deals with aspects which are too briefly treated (or neglected altogether) in text-books. The author has avoided using the difficult mathematical approach. A certain amount of simple arithmetic and derivation of a few simple equations are an absolute necessity for the subject, but Mr. Field explains them very simply. Readers may feel that his treatment of modern theories of strong electrolytes is rather inadequate. However many people think that these theories are not yet sufficiently developed to give much help in solving practical problems of electrolytic reactions.—S. W. B.

Books Received

Classified Examples in Electrical Engineering, Volume II: Alternating Current. By S. Gordon Monk, M.Sc.(Eng.), M.I.E.E. Sixth Edition. Pp. 205; figs 11; answers. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 8s 6d.

Overhead Line Practice. By J. McCombe, Ph.D., M.I.E.E. Pp. 269; figs. 158, index. Macdonald & Co. (Publishers), Ltd., 19, Ludgate Hill, London, E.C.4.

Industrial High Frequency Electric Power By E. May, B.Sc., M.I.E.E. Pp. 355; figs. and index. Chapman & Hall, Ltd., 37, Essex Street, W.C.2. Price 32s.

Electric Intallations. — Edited by E. Malloy. Second edition. Pp. 544; figs. and index. George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2. Price 15s.

Permanent Magnets.—By F. G. Spreadbury. Pp. 280; figs. and index. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 35s.

Commerce and Industry

Cable Makers' Winter Arrangements
Wages in the Contracting Industry

THE Electrical Trades Union states that the Union's applications for a substantial increase of wages for members employed in the electrical contracting industry have been rejected by the National Federated Electrical Association and the E.C.A. of Scotland. The claims have now been submitted to the National Arbitration Tribunal.

The N.F.E.A. has agreed to support the Union's request for an increase in the holiday credit stamp from 2s 3d to 2s 6d for journeymen and from 1s 9d to 2s for mates.

It is also reported in the Union's journal that the North Western Electricity Board has now decided to pay members employed in the Board's contracting departments the 1d per hour increase awarded in the electrical contracting industry last November with full retrospective effect.

Cable Makers and Load Spreading

The Joint Industrial Council for the Electrical Cable Making Industry has agreed, to certain arrangements necessitated by industrial load spreading during the coming winter. The effect is to permit the hours worked at normal rates to range between 7 a.m. and 8 p.m. or between 7 a.m. and 12.30 p.m. on Saturdays, if necessary, provided the total of 44 hours per week is not exceeded. Overtime rates will be paid for work before 7 a.m. and after 8 p.m. In the case of night shifts, double day shifts and three-shift systems it will be permissible to rearrange (by local agreement) the starting and finishing of shifts to meet local requirements.

Institution of Works Managers

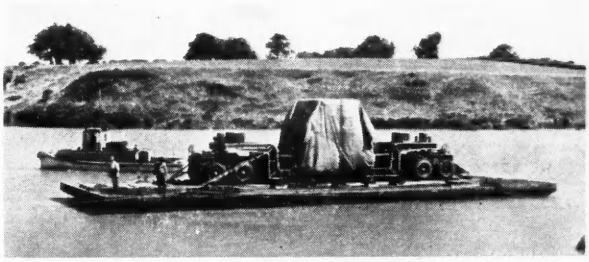
The first annual general meeting of this Institution since its merger with the Institution of Factory Managers is to be held on 28th October at the Royal Society of Arts building, London, W.C.2. The report for 1948-9 which is to be presented at the meeting records a total membership, at 30th June last, of 1,602, an increase of 367 during the year. Mention is made of the activities of the branches—London (with S.E., S.W. and Wembley sub-branches), Bristol, Tees-side, Glasgow, Manchester, West Yorkshire, Leeds, Leicester, Sheffield, Merseyside and West Midland.

Business Efficiency Exhibition

The Business Efficiency Exhibition will be held at Olympia from 9th to 19th November next.

Barge Transportation

The transport of heavy plant to site often presents peculiar problems, particularly in overseas countries; each instance has to be carefully considered and methods devised, appropriate to the local conditions. The accompanying picture shows how three B.T.H. 30 MVA synchronous condensers completed the final stage of the journey from the B.T.H. Rugby Works to the Otahuhu sub-station of the New Zealand Government Hydro-Electric Department.



B.T.H. condensers on the way to Otahuhu substation, New Zealand

Otahuhu is only nine miles from Auckland, but neither the rotors nor the stators could be rail-hauled because of tunnel limitations, and the roads for the whole distance, being within the Metropolitan area, were barred. Otahuhu is, however, close to the head of a tidal inlet, so sea transport could be used. Accordingly a barge capable of carrying a special road trailer, weighing 76 tons when loaded with a stator or rotor,

was obtained. At Auckland, each rotor and each stator were lifted from ship to trailer on the barge, which was towed to a point near the sub-station. Here a landing stage was arranged so that the trailer could be towed off the barge to the sub-station, about half-a-mile distant. The road trailer had previously been used in connection with the transport by road and rail of two B.T.H. synchronous condensers from Wellington to Bunnythorpe—a distance of ninety-four miles, through very difficult country.

Works Visit

A visit was recently made by Mr. L. H. Pike, Agent General for Queensland, to the works of Gresham Transformers, Ltd., to inspect some of the high-voltage transformers which the company is manufacturing for the Queensland State Electricity Commission. In the accompanying picture Mr. Pike is seen inspecting the transformers.

Mr. L. H Pike at the works of Gresham Transformers, Ltd., showing (leit to right) Mr. T. G. Martin (sales manager), Mr. Pike, Mr. J. A. Clegg (technical director), and Mr. J. P. Coleman (chairman)

Cables for Filton Airport

A total of thirty miles of cables manufactured by British Insulated Callender's Cables have been used for the electrical system at Filton Airport. These include cables for the 11 kV supply to the assembly hall, supply feeders and communication lines to the many ancillary buildings, cables for lighting and signalling, distribution cables and l.v. cables.

Scottish Engineering Students

The Scottish Engineering Students' Association was formed in 1945 with the objects *inter alia* of reading and discussing papers and for social intercourse for younger men. The headquarters is in Glasgow, and there is a branch in Edinburgh, while other branches in Scotland are contemplated. The Association, which has a membership of 600, has received recognition from a large number of institutions and societies and its programme of meetings arranged up to the end of this year, is an interesting one and includes papers dealing with plastics, gear cutting and marine and industrial gas turbines. The hon. secretary of the Association is Mr. W. Marley, 16, Eskdale Street, Glasgow.

"Ekco" Window Display Results

Entries in the Ekco window display competition from radio dealers all over the country were recently judged at the company's London offices and the following dealers were awarded the first three prizes: First prize (£100), Whizzards, 136, Baker Street, W.1; second prize (£50), F. A. Goode, Ltd., Northampton; third prize (£20), E. Upton & Sons, Ltd., Middlesbrough. The panel of judges presided over by Mr. E. K. Cole consisted of Mr. O. Pawsey, editor *Electrical and Radio Trading*, Mr. W. E. Miller, editor *Wireless and Electrical Trader*, Mr. E. Sotheran, editor *Music Trades Review*, and Mr. W. Coates, the industrial artist who designed the company's "Princess" portable radio receiver. The presentation of cheques to the prize-winning dealers took place on 4th October at the Radio Exhibition at Olympia.

Lead Prices Reduced

On 5th October the Ministry of Supply announced a third cut in the price of good soft pig lead since the price was raised after devaluation of sterling to £122 a ton. The new price of £111. The reduction follows falls which have occurred in United States lead prices.

I.H.V.E Examinations

The next examinations for graduateship and associate membership of the Institution of Heating and Ventilating Engineers will be held in London and the provinces on 22nd April, 1950. New applicants must submit a completed proposal form for membership by 31st December next and those who are accepted as examination candidates must submit an examination application

form before 28th February (31st January for overseas candidates).

"Closed Shop" at Croydon

As the result of a strike of bricklayers, carpenters and labourers engaged in the construction of the new Croydon power station the contractors, Sir Robert McAlpine & Co., posted notices last week informing all non-unionists on the site that they must join their appropriate trade union. The alternative was to leave the job.

A Fisher Sales Aid

An attractively produced album has been issued by H. Fisher (Oldham), Ltd., to their authorized dealers and to Area Electricity Boards. This consists of a set of photographic reproductions on stout varnished sheets of the Fisher washing machine, clothes dryer, water heater, immersion heater, thermostat and dry sterilizer, with descriptive notes of the apparatus.

Standard Telephones Sales Conference

The second annual sales conference of the Newport Cable Division of Standard Telephones and Cables, Ltd., was held from 3rd to 5th October at the company's Newport (Mon.) factory. Among those who attended were Mr. H. J. D. Shrimpton, manager of the Newport location, Mr. H. W. Turner, cable sales manager, Mr. G. D. Cherry of A. W. Gordon, Ltd., the company's Belfast agents, and representatives from areas where sales and service facilities have been developed during the past eighteen months.

Trade Announcements

Ekco-Ensign Electric, Ltd., has appointed Mr. T. P. Jennings as its representative in London covering most of the western postal districts and parts of Middlesex. Mr. Jennings, who commenced duties at the end of September, may be communicated with at the company's London office, 5, Vigo Street, W.1 (telephone: Regent 2601) or at 33, George V. Way, Perivale, Middlesex.

Mr. J. A. Eaton has been appointed as a new representative of the company in the area covering the greater part of Staffordshire. Mr. Eaton will operate from the company's northern sales office at Kent Street Works, Preston, Lancs.

Sobel Industries, Ltd., is opening a television depot at 36, Dalton Street, Birmingham, 4 (telephone: Central 8039), on 17th October. The depot will be in the charge of Mr. T. M. Flockhart, and will distribute all television receivers for the Midlands, with the exception of those which will be handled by F. Westerman (Wholesale), Ltd. It will, in addition, deal with normal requests for radio and television service and television installation. Facilities for the "Sobellette" and requests for spares will, however, still be handled by the Service Dept. at Langley Park, Slough, Bucks.

In addition to their Dale End and Dalton Place premises **F. Westerman (Wholesale), Ltd.,** have now a warehouse extending from Dalton Street to Corporation Street, Birmingham. The company's radio and domestic appliances section has also taken additional premises in Dalton Street, to house the television stores and Service Department.

Walker, Ltd., Upper Liffey Street, Dublin, have recently been appointed as the sole distributors in Eire for Ediswan fluorescent, industrial and commercial lighting equipment. For some time **Kelly & Shiel, Ltd.,** United Works, Distillery Road, Dublin, have been the sole distributors in Eire for "Mazda" radio valves and radio products (for replacement purposes). Inquiries for other Ediswan products should be directed to the Edison Swan Electric Co., Ltd., 12, King Street, Belfast.

Plant for Haifa Power Station

A 30,000 kW alternator stator weighing eighty-four tons, its rotor weighing twenty-two tons, and an 11kV to 115 kV transformer of fifty-eight tons were recently despatched from the Royal Albert Docks to

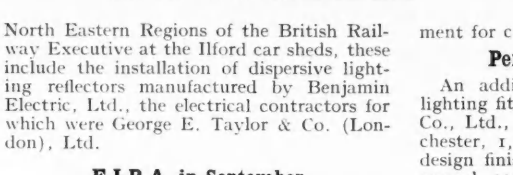
G.E.C. transformer en route to Palestine

Haifa. At the Haifa Docks there are no facilities for handling such heavy loads and a special heavy lift cargo vessel had to be chartered. The T.E.S. *Empire Wallace*, now on her way to Palestine, is one of four similar vessels equipped by the G.E.C. with turbo-electric propulsion equipment built at the Witton Works during the latter part of the war. The plant now being shipped is for the Haifa power station of the Palestine

Electric Corporation to whom the G.E.C. has previously supplied steam turbo-driven and hydro-electric generators with a total output of over 70,000 kW as well as many transformers and a large amount of switchgear for outdoor distribution schemes. Three G.E.C. generators are already in service in the power station.

Electric Car Shed Lighting

In connection with the Liverpool Street to Shenfield electrification, improvements have been carried out by the Eastern & North Eastern Regions of the British Railway Executive at the Ilford car sheds, these include the installation of dispersive lighting reflectors manufactured by Benjamin Electric, Ltd., the electrical contractors for which were George E. Taylor & Co. (London), Ltd.



Benjamin reflectors at the Ilford car sheds

E.I.B.A. in September

It is regrettable to learn from Mr. H. S. Forthergill, the secretary, that once again monthly receipts of the Electrical Industries Benevolent Association have failed to come up to hopes. Up to the end of September £22,350 had been received whereas £24,750 was aimed at. During September amounts of over £50 arrived from the following:—Radio Industries Club of Scotland (donation), £177; Radio Industries Club Ball (sale of programmes), £100; British Refrigeration Association (subscription), £52.

Peat Fuel for Gas Turbines

Sir Edward Appleton, Principal of Edinburgh University, is chairman of a committee set up to advise the Secretary for Scotland on a survey of Scottish peat bogs and on research into the possibilities of using peat as fuel for gas turbines. The committee's scope will include the obtaining and handling of peat and the study of the use of peat as fuel for gas turbines will be related to the activities of the North of Scotland Hydro-Electric Board.

Catalogues and Lists

Synthetic Carbon & Engineering Co., Ltd., Cumberland Road, Stanmore, Middlesex.—Catalogue of carbon brushes and components, controller parts, contacts and brush holders.

Sunvic Controls, Ltd., 10, Essex Street, London, W.C.2.—Two technical folders on a creep test furnace control panel and a d.c. amplifier for thermocouple and strain gauge work.

Westool, Ltd., St. Helens Auckland, Co. Durham.—Technical folder on the series "E" pull and thrust d.c. solenoids.

M. K. Electric, Ltd., Wakefield Street, London, N.18.—Four priced folders on cooker control units, moulded material and metalclad switched sockets and domestic switches and accessories.

Siemens - Schuckert (Great Britain), Ltd., Great West Road, Brentford, Middlesex.—Instruction booklet on flameproof electric drilling equipment for coal and stone.

Pendant Lighting Fitting

An addition to the range of domestic lighting fittings made by the Dexray Engg. Co., Ltd., Brock Street, Lees Street, Manchester, 1, is an all-metal unit of original design finished in bright polished and lacquered copper or bright chrome. It is fitted with attractive down-light glass shades, crystalline edged. The overall spread of the fitting is 18in.

Information Department

THE extensive records of our Information Department enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

"GOODING" partial-break locators for cable repairs.

"R.E.A.X." electric irons.

"VULCAN" soldering irons.

General inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by the Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Induction Furnaces

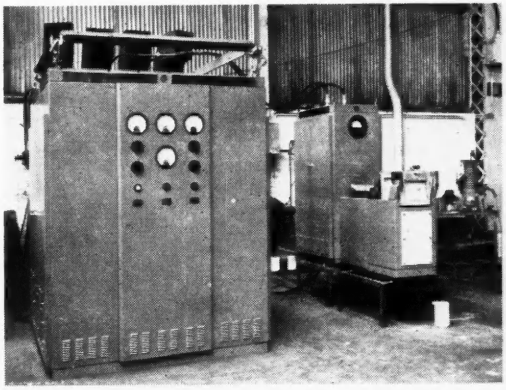
25 KW UNIT UNDER TEST AT TRAFFORD PARK

IT has recently come to our attention that a 25 kW radio frequency induction furnace is under test at the Trafford Park works of the Metropolitan-Vickers Electrical Co., Ltd. As most engineers will be aware, this type of furnace is becoming increasingly popular and the unit in question is capable of melting 20 lb of ferrous metal in 20 to 30 minutes. In addition, is can also be converted to perform annealing, hardening, brazing and similar operations.

The frequency of operations is nominally 600 kc/s, which was chosen because both the capital cost of the equipment and the running costs are economical. The use of radio frequency permits the melting of very small charges and even powdered substances, which are themselves capable of conducting electric currents but in which the surface of the particles resists the passage of current.

The induction method has the advantage that it results in a clean melt under controlled conditions and the temperature of the charge can be maintained at any required figure or increased to a limit determined chiefly by the crucible. The apparatus also requires no expensive foundations or elaborate buildings, in fact the smaller units can be portable.

Metropolitan-Vickers make three sizes of equipments having maximum radio frequency outputs of 5, 10 and 25 kW capable of melting 5, 10 and 20 lb of ferrous metals respectively in 20 to 30 minutes. The capacities of these units when used for melting non-ferrous metals are less and any such metal will be considered individually. Melting takes place in air and if special atmospheres or vacuum melting are required, non-standard equipment can be supplied by the manufacturers.



Metropolitan-Vickers 25 kW radio frequency induction furnace (oscillator cubicle on left)

Australian Power Exhibition

OPENED IN LONDON BY MINISTER OF SUPPLY

AN exhibition designed to show the steps being taken in one of the many large industrial cities of Australia to reduce the acute shortage of generating capacity in the Commonwealth was opened on Monday last by Mr. G. R. Strauss, Minister of Supply, at Australia House, Strand, London, W.C.2. The display is also intended to draw attention to the market for large generating plant of all kinds existing in Australia, to the necessity for an improvement in deliveries of such plant if newly transferred sections of British industry and population are to be maintained in full employment in the Commonwealth, and, at the same time to pay tribute to the British Government Departments and manufacturers for the efforts made in recent difficult years to assist Australian electricity supply authorities—such as the Sydney County Council—to maintain at least a fair proportion of their normal loading by granting a measure of priority to the most urgent orders.

The exhibition is of particular interest to representatives of British commercial and manufacturing organizations who are contemplating extending their activities in or to Australia and also engineering personnel concerned with modern high-pressure/high-temperature steam cycles. The Pyrmont station will be the only plant of its kind in Australia, although a small "topping" back-pressure turbine of 9,000 kW operating at similar steam conditions has been installed

in the Balmain station of the Electric Light & Power Supply Cpn., Ltd., Sydney. (See *Electrical Review*, 17th October, 1947.)

The display consists of large models of Pyrmont boiler plant, apparatus and actual devices (electrical and mechanical) destined for the station, coloured transparencies and cross-sectional drawings of the plant and equipment, together with a large number of photographs and artists' conceptions, showing manufacture proceeding in British factories and erection of building progress in Australia.

There are nine sections indicating plant and equipment which is being supplied for this station, including turbo-alternator (Metropolitan-Vickers), steam and feed pipework (Stewart & Lloyds), stop valves (Hopkinsons), integral pipework (Aiton & Co.), superheater and desuperheaters (Superheater Co.), boilers (International Combustion), and ash and dust plant (B.V.C. Industrial Constructions). The first section explains the aims and reasons for the exhibition, and the last tells the story of the preparation of foundations and the erection of steelwork for the Pyrmont buildings.

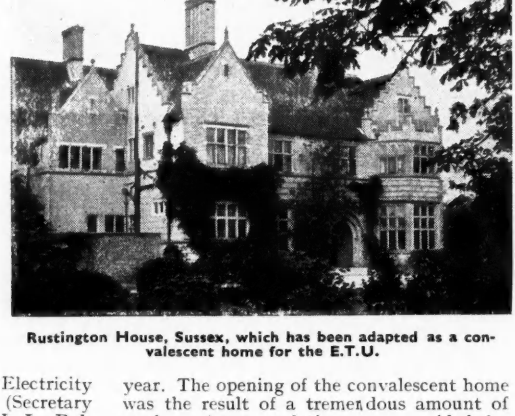
At the opening ceremony, Mr. Strauss was introduced by Mr. E. McCarthy, the Acting Deputy High Commissioner for the Commonwealth, who expressed the thanks of the Australian Government to the British Government and manufacturers for the help they had given in providing the much needed supplies of generating plant. He said they anticipated that between 1950 and 1960, the generating capacity of Australian power stations would be more than doubled, and in New South Wales alone it would reach over 2,000,000 kW. The plant to be installed at Pyrmont would include four 50 MW turbo-alternator sets, and 430,000 lb boilers. As Australia developed she would be more and more dependent on the supply of generating plant from this country.

Mr. Strauss, in declaring the exhibition opened said that the Government decided during the war to allot a proportion of our production of generating plant to Australia. We were fully aware of the power shortage in Australia, and although we had not been able to supply plant as fast as Australia would like, the supply had been accelerated in the past few months.

E.T.U. Convalescent Home

OFFICIAL OPENING OF PREMISES IN SUSSEX

PLEASANTLY situated overlooking the South Downs and within three-quarters of a mile of the sea near Littlehampton, Rustington House was last week officially opened as a convalescent home for members of the Electrical Trades Union.



Rustington House, Sussex, which has been adapted as a convalescent home for the E.T.U.

The ceremony, performed by Mr. F. G. Lawrence, chairman of the Rustington Parish Council, was followed by a tour of the building. Among those present were the Mayor and Mayoress of Worthing (Councillor and Mrs. H. Woodford), Sir Robert Gould (Industrial Relations Department, Ministry of Labour and National Service), Mr. E. W. Bussey (Member of the British Electricity Authority), Mr. Morgan Phillips (Secretary of the Labour Party) and Mr. H. L. Bullock (chairman, T.U.C.), together with Mr. F. Foulkes (president), Mr. W. C. Stevens (secretary) and members of the National Executive of the E.T.U.

Mr. Foulkes spoke of the project as one of two which the Union had had in mind for some time, the other being a training college which is expected to be ready next year. The opening of the convalescent home was the result of a tremendous amount of work. Accommodation was provided for nineteen member guests, who would stay for a fortnight, and the cost, including travelling expenses and £1 a working day allowance for lost time, would be met by the Union. They had a long waiting list. The facilities were being provided without any increase in subscriptions.

Mr. Bullock congratulated the E.T.U. on

its enterprise in providing the new home, and Mr. Morgan Phillips expressed the hope that it would be the precursor of others in the trade union movement.

Rustington House, a two-storey building standing in four acres of well-laid-out grounds, is a comparatively modern house which once belonged to the Hutchinson family of the well-known publishing firm. A considerable amount of internal alteration and re-equipment has been carried out, the total cost together with the purchase price being about £20,000.

The accommodation includes a large dining room, study and library, lounge with television installed, and a billiards room, while a temporary bungalow has been erected adjoining the house for games. The electrical installation has been renewed and extended, electric fires being provided in each bedroom. The kitchen equipment includes G.E.C. and Creda cookers and a Santon water heater. Synchronome clocks are fitted throughout the house. The supply is taken from the South Eastern Electricity Board's mains, the intake being through Simplex switch and fuse gear. The installation work was carried out by M. O'Rourke, of Worthing.

Mains Lighting in Coal Mines

A RECORD number of members of the Scottish Branch of the Association of Colliery Managers attended a lecture on "Mains Lighting in the Mines," delivered at Glasgow, by Mr. R. Crawford, chief electrical engineer, National Coal Board.

Mr. Alex Dewar, president of the Branch, was in the chair. Among others present were Mr. L. R. Milligan (national president of the Association), Dr. W. Reid (production director, Scottish Division, N.C.B.), and Mr. G. Mullin (past-president of the Scottish Branch of the Association).

A satisfactory standard of illumination at the coal face must depend primarily upon the development of mains lighting complementary to, or in substitution for, portable lighting, said Mr. Crawford. This was a recommendation of the Technical Advisory Committee on Coal Mining.

The capital cost of equipping collieries throughout Britain with general lighting, the lecturer estimated at £5,000,000 and maintenance and running costs at 2½d or 3d a ton.

In the discussion which followed demonstrations of the various types of equipment available to-day, Mr. Milligan questioned the advisability of installing lighting wholesale at such a cost without some assurance of a reasonable return on the outlay. There was a measure of agreement, nevertheless, that such a progressive step could not be retarded because of economic considerations and that in the first instance it would perhaps have to be taken on trust that the cost would be later justified by improved performance by the miners.

It was announced that in addition to the experiment on face lighting which is at present being carried out at Easton Colliery, Bathgate, further experiments in Fife, Ayrshire and the Lothians are to be carried out soon.

Smoke Abatement

Association's Annual Conference

THE annual conference of the National Smoke Abatement Society was held at Harrogate from 28th to 30th September. In his presidential address, Lord Simon traced the history of smoke abatement from the ineffective punitive legislation of 1307 to the present time, concluding with the reference in the Egerton and Simon Reports to the need for reducing smoke from bituminous fuel and for securing an extended use of electricity and gas.

Of the twenty papers and reports presented, those of most electrical interest were "Progress with Electricity," "The Work of the Fuel Research Station of the D.S.I.R." and "The Carrington Area Investigation." In the first the Electrical Development Association summarized developments in electricity's aid in smoke abatement. In the second Dr. A. Parker included statements on the fouling of external surfaces in boilers and its relationship with inorganic substances in the coal and on the use of pulverized fuel in connection with the experimental Vortex combustion chamber (500lb/hr) with the high heat release at atmospheric pressure of 500,000 B.Th.U./cu ft/hr. A combustion chamber of similar size, but with the ultimate duty of burning 2,000 lb/hr to give two million B.Th.U./cu ft/hr, he said, had been designed for ascertaining the feasibility of using pulverized coal in gas turbines. Investigations into the production of producer gas for the same purpose were also in hand at the present time.

In the third paper mentioned, Dr. C. Metcalfe Brown described the methods adopted for measuring sulphur and other deposits in the neighbourhood of Carrington power station in Cheshire. There was also a contribution by Mr. D. V. H. Smith giving leading particulars of the fourteen district heating schemes so far approved in this country.

FINANCIAL SECTION

Company News
Stock Exchange Activities

Reports and Dividends

The Oriental Telephone & Electric Co., Ltd., reports a balance on profit and loss account for 1948, after making provision for income tax based upon operating profits for 1948, of £56,458, as compared with £69,566 for the preceding year. No dividend has been brought into the profit and loss account this year from the China & Japan Telephone & Electric Co., due to the delay in the receipt of accounts from Hong Kong. A different method of dealing with income tax has been adopted and consequently the balance of profits shows a reduced figure from which the dividends are appropriated as net figures. The comparable profit figures on the basis of 1947 accounts are £97,513 for 1948 against £110,621 for 1947. The final ordinary dividend is 12 per cent, again making 16 per cent for the year. Contingencies reserve receives £5,000 and £73,740 is carried forward (against £72,459 brought in).

Peto Scott Electrical Instruments, Ltd.—The annual meeting was held on 10th October. In his circulated address, Mr. M. C. Jones (chairman) says that the radio industry has been hindered by shrinkage of export trade due to prohibition of imports and foreign exchange regulations in many countries, the high purchase tax, and the slow progress in setting up television stations to give coverage to the whole of the United Kingdom. To offset the unfavourable influences in the radio market, their company has turned its attention to other instrument making and engineering work, and it continues to be actively engaged on work for various Government Departments.

The East African Power & Lighting Co., Ltd.—Underwriting has been completed of an issue of 1,000,000 4 per cent £1 cumulative preference shares at 20s per share and 1,000,000 £1 ordinary shares at 30s per share, and lists will open and close on 21st October. A minimum of one-third of each class will be made available to meet applications received in East Africa, while preferenclass will be made available to meet applications from existing shareholders. The issue is being made under the auspices of the Power Securities Corporation, Ltd.

The British Electric Resistance Co., Ltd., reports a profit for the year ended 31st July last of £35,905, and after deducting depreciation and directors' remuneration there is a balance of £26,991 (against £24,272). Taxation absorbs £15,000, and the final ordinary dividend is 15 per cent, again making 20 per cent for the year. The balance carried forward is £7,912 (against £6,911 brought in).

The Hackbridge & Hewittic Electric Co., Ltd., has decided to issue 200,000 5s ordinary shares at par to existing ordinary shareholders in the proportion of one new share for every nine held.

The Ever Ready Trust, Ltd., has declared an interim dividend of 5 per cent (against 3 per cent) on both ordinary stock and deferred shares. This alteration is in accordance with the board's intention to more nearly equalize the interim and final dividends and should not be taken as an indication of any change in the total distribution for the year.

Solus Teoranta has announced an interim dividend of 5 per cent (unchanged) on the "A" and "B" shares.

Scophony-Baird, Ltd., reports that the draft accounts, subject to audit, for the year ended 31st March last, show a trading loss of rather more than £8,000, and after providing for interest charges, directors' remuneration, and writing off £16,119 for research and development and £2,688 for the costs of capital reduction and new issue which took place during the year, the total loss amounts to rather more than £30,000, as compared with £33,216 for the preceding year.

The Marconi International Marine Communication Co., Ltd., is paying an interim dividend of 2½ per cent (unchanged).

New Companies

Inman & Adler, Ltd.—Registered 23rd September. Capital £2,000. Manufacturers of and dealers in electric, electronic, mechanical, hydraulic, engineering and other equipment and accessories and manufacturers and sellers of instruments in connection with surgery, therapeutics, etc. Directors: L. G. Inman and A. Adler. Secy.: A. Adler. Regd. office: Charles Street, Walsall.

Carrick Engineering (Stewarton), Ltd.—Registered 13th September. Capital £30,000. Engineers, manufacturers and repairers of and dealers in mechanical and

electrical machinery, instruments and plant, dynamos, cables, switchgear, pumps, compressors, etc. Solrs.: Slaughter & May, 18, Austin Friars, E.C.2.

Homecord, Ltd.—Registered 20th September. Capital £1,000. Electricians, dealers in electrical, mechanical and radio products, etc. Directors: H. D. Cartlidge and A. Becker. Regd. office: 8, Westbourne Grove, Bayswater, W.2.

Eeziphone Ltd.—Registered 16th September. Capital £100. Manufacturers of and dealers in electrical and telephonic instruments, appliances and apparatus, etc. Directors: S. Stewart, L. Namenyi-Katz and S. R. Bright. Regd. office: 46a, Finsbury Square, E.C.2.

Couzens & Banks, Ltd.—Registered 27th September. Capital £2,000. Manufacturers, hirers and repairers of and dealers in radio and television receivers and transmitters, rediffusion and electronic equipment, etc. Directors: N. J. Couzens, E. Couzens, F. A. Banks and Cissie Banks. Regd. office: 48, Liverpool Road, Stoke-on-Trent.

Electrical Services (Cowley), Ltd.—We regret that in recording the registration of this company in our last issue, the title was incorrectly given as Electrical Services (Coxley), Ltd.

Increases of Capital

Erskine, Heap & Co., Ltd.—Increased by £50,000, in 10s ordinary shares, beyond the registered capital of £50,000.

Sangamo Weston. Ltd.—Increased by £157,500, in 10s ordinary shares, beyond the registered capital of £160,000.

R. Darbyshire, Ltd.—Increased by £10,000, in £1 shares, beyond the registered capital of £10,000.

H. J. Baldwin & Co., Ltd.—Increased by £100,000 in 50,000 6 per cent cumulative preference shares of £1 and 500,000 ordinary shares of 2s each, beyond the registered capital of £150,000.

H. D. Symons & Co., Ltd.—Increased by £25,000, in £1 ordinary shares, beyond the registered capital of £30,000.

Murex, Ltd.—Increased by £1,000,000, in £1 ordinary shares, beyond the registered capital of £1,650,000.

Liquidations

British Rola, Ltd., Ferry Works, Thames Ditton, Surrey.—Pursuant to Section 293, of the Companies Act, 1948, a meeting of creditors was held on 5th October at Winchester House, Old Broad Street, London, E.C., when a statement of affairs as at 3rd September last was submitted which showed liabilities amounting to £113,350. After allowing £312,000 due under the debenture the net assets were estimated to realize £112,038, showing a deficiency of £1,312 so far as the creditors were concerned. The chairman reported that the reason the meeting had been called was that the petition presented for winding-up was defended by the company, and upon agreement the petition was stood over on the condition that shareholders put the company into voluntary liquidation. The shareholders, at their meeting, had passed a resolution appointing nominees of the creditors and shareholders respectively as joint liquidators. The creditors decided to confirm the voluntary liquidation with Mr. G. C. Jarvis, Ling House, 10-13, Dominion Street, London, E.C.2, and Mr. K. R. Cork, of 19, Eastcheap, London, E.C.3, as joint liquidators. A committee of inspection was also appointed consisting of the representatives of four creditors and two shareholders. It was stated that two offers had been received and now that the company had gone into voluntary liquidation there was a possibility of a third offer, and it was hoped that the claims of the creditors would eventually be paid in full.

The Antrim Electricity Distribution Co., Ltd.—Voluntary liquidation. Meeting, 88, Kingsway, London, W.C.2, to receive an account of the winding-up by the liquidators, Messrs. W. J. Coad and S. H. Coombe.

O'Connor Electrical Industries, Ltd.—Members' voluntary winding-up. Meeting of members at 202, Bishopsgate, London, E.C.2, on 9th November, to receive an account of the winding-up by the liquidator, Mr. L. V. Russell.

Union Electrical Co., Ltd.—Meetings 19th November at 1, Corporation Street, Hyde, Ches., to receive an account of the winding-up by the liquidator, Mr. J. A. Taylor.

Bankruptcies

H. Evans, who carried on business at 60, Berners Street, London, W.1, as electrical factor.—Last day for receiving proofs for dividend 20th October. Trustee, Mr. W. F. Cresswell, Bankruptcy Buildings, Carey Street, London, W.C.2, Senior Official Receiver.

S. Budge, 153, Cleethorpes Road, Grimsby, radio and electrical dealer.—Receiving order made 4th October, on a creditor's petition.

Capital Reduction Petition

A petition has been presented to the High Court of the Isle of Man for confirming the reduction of the capital of the Manx Electric Railway Co., Ltd., from £275,000 to £185,000, and will be heard at the Court House, Douglas, I.O.M. on 19th October.

FINANCIAL SECTION
STOCKS and SHARES

POSSIBILITIES of an early General Election have been brought nearer by recent official announcements, and, on the assumption that an election may take place this year, prices in the gilt-edged market of the Stock Exchange have fallen away somewhat abruptly. British Electricity and British Transport stocks have all given way, following the example set by consols and other British Government securities. Business has quietened down; only in mining shares is there any substantial degree of activity noticeable.

Devaluation effects are beginning to make their influence felt in most of the Stock Exchange markets. On the first announcement, there was a rush to buy gold mining shares as well as the ordinary shares of commercial and industrial companies from which anything like a living rate of yield was available. The early wave of buying of industrial ordinary shares gave way, however, to a larger volume of selling, most of it of modest proportions, but sufficient to make its weight felt against the buying which had taken place previously. On balance, the changes since a week ago are of no great consequence.

The Week's Changes

Automatic Telephone old shares at 51s 3d are 1/16 better and Globe Telegraph, following a rise in Cable preference, also gained 1/16 at 43s 9d. Indian shares are better, notably Cawnpore Electric at 40s, a rise of 3s 9d, Madras Electric, 32s, and Calcutta Trams, 27s 6d. Tube Investments have lost 3s 9d at 5 9/16. General Electrics went back to 78s 6d, Ever Ready to 28s 6d and Burco to 18s 9d. The previous rise in Telephone Properties has been further continued and at 15s 9d the shares are 1/16 higher on the week. Hackbridge and Hewittic Electrics are now quoted ex rights to the new shares, one new at 5s for 9 old. The new are 6s 4½d premium, and the old 11s 6d.

Automatic Telephone New Shares

The new ordinary shares offered at 50s to stockholders in Automatic Telephone & Electric have proved a popular issue, the premium having risen from 1s 3d at the start of dealings last week, to 2s 3d now. The first call of 20s per share is due on the 14th of this month, and the final 30s on 25th November. The shares will rank for this year's final dividend, which was declared last time in May; they will be available free of transfer stamp to the buyer until the last call is due. On the company's regular 12½ per cent dividend, the yield works out at £4 16s per cent.

Scophony-Baird

This company's trading loss of £8,000, increased to about £30,000 by various charges, is in accordance with the statement made by the chairman on the occasion of the change of name (from Scophony, Ltd.) last February. The ordinary shares, which were written down from 5s to 1s in the course of last year's reconstruction, came back a fraction on publication of these preliminary figures. They are still quoted around three times their par value, a fact which implies confidence in the future of television as the new broadcasting stations begin to open up the commercial field.

Shares on Offer

Henley's Telegraph and A.E.I. are setting the pace in the electrical equipment group, yields at the offered prices of 25s and 76s 3d being respectively 4 per cent and a fraction less. Aberdare Cables are offered at 57s 6d, showing a yield of 5¼ per cent on last year's 15 per cent payment, and without taking into account the recent increase in the interim from 6 to 12½ per cent. Chloride Electricals at 93s pay £4 6s per cent, Cromptons at 25s give 4½ and Crabtrees, at 35s, 5 per cent. Aerialite 1s shares, which have been a better market since Radiolympia, stand at 15s and return 10 per cent on the money. Morphy Richards at 14s 6d are on an 11 per cent yield basis.

Preference Shares

Despite the dullness of the gilt-edged market, good preference shares in many companies are still in anything but plentiful supply. Dealing in large numbers is not easy, except in the case of the big issues, among which G.E.C. 7½ per cent preference may be mentioned as being on offer at 33s to yield 4½ per cent. The popular 4 per cent issues hold tenaciously to the neighbourhood of par. Enfield Cables new 4½ per cent are offered at 21s 6d, paying £4 3s 9d per cent on the money. Laurence, Scott 4¼ per cent at 20s 9d and Crompton Parkinson "sixes" at 29s return a little less. A yield of about 4½ per cent can be obtained from Hackbridge Cables 5 per cent preference at 23s 6s, and of 4 per cent from Scottish Cables 4½ per cent at 22s. Among the high-priced shares, B.I.C. "sixes" at 29s 6d have an unfamiliar look on a yield basis of more than 4 per cent.

Electricity Supply

Manchester Power Station Extensions : B.E.A. Collier Launched

THE Stuart Street power station extensions, which were commenced by the Manchester Corporation Electricity Department, are almost completed and initial running tests are now in progress. The work marks approximately fifty years' progress in the design of plant for electricity generation at this particular site.

The new turbo-alternator is the largest in the North Western Division of the British Electricity Authority and the two associated steam generators are among the largest in Great Britain. The alternator is rated at 61,500 kW and is driven by a 80,000 h.p. turbine, taking steam at 600 lb/sq in and 850 deg F and running at 1,500 r.p.m. The total weight of the revolving parts is 122 tons, and the complete machine weighs 518 tons. It is 97 ft long. The two new boilers are fired with pulverized fuel and each unit can evaporate 180 tons of water an hour at 650 lb/sq in and 875 deg F. The boilers are designed for automatic control from an air conditioned room alongside. Each boiler is provided with three coal pulverizing mills capable of crushing 31 tons per hour. Coal will be supplied direct from the adjacent Bradford Colliery via a tunnel and overhead conveyor belt system with a capacity of 200 tons per hour.

New B.E.A. Collier

On Friday last, at Aberdeen, Dame Caroline Haslett, who is a member of the British Electricity Authority, launched the latest of the B.E.A. colliers which bears her name. The new vessel, which will serve the London Division, is of the raised quarter-deck type with bridge and topgallant forecastle. She is especially designed for the transport of coal from northern ports to the Thames and for passing under the low-span Thames bridges. The length of the ship is 260ft, the breadth 39ft 6in, the depth moulded 18ft 6in, and the deadweight about 2,700 tons.

All deck machinery is electrically driven and includes a windlass which is also used for hauling No. 1 hatch cover; a hauling winch is placed amidships for Nos. 2 and 3 hatch covers and a warping winch fitted at the after end of the ship. The steering gear is of the electro-hydraulic type and is fitted over the rudder head; it is controlled from the navigating bridge by telemotor gear. The masts are arranged to telescope into the holds. The propelling machinery consists of an 1,180 b.h.p., 225 r.p.m., eight-cylinder marine diesel engine manufactured by British Polar Engines, Ltd., Glasgow. This engine and engine-room auxiliaries are being installed by the Engineering Department of Hall Russell & Co., Ltd. The *Dame Caroline Haslett* has been constructed under the supervision of Mr. N. W. Dawson, chief superintendent engineer, Stephenson Clarke, Ltd.

Drought Cuts Supply

The Irish Electricity Supply Board has informed consumers that in view of the unusually long period of drought the restrictions on the use of electricity must continue. The danger to the maintenance of supply is aggravated by the rise in consumption which normally occurs at this time of the year. Some consumers are using electric fires in spite of the prohibition in force on the use of such equipment, and the Board issues a warning that disconnection of the supply will be the penalty for failure to comply with the restrictions.

Domestic Load Spreading

"Use Electricity—Off Peak" is the theme of the South Western Electricity Board's winter load spreading campaign for domestic consumers. This year the peak hours during which economy is requested have been shortened. Between 1st November and 15th January the periods are 8 to 9.30 a.m. and 4 to 5.30 p.m., Monday to Friday only. Up to 1st November and after 15th January (until the end of March) the appeal for economy is confined to the morning peak period. Districts have been allotted specific days on which they will be liable to cuts if these are inevitable.

Fluorescent Lighting

Berwick Town Council's plans for improving the lighting of the Great North Road with fluorescent lighting will cost about £5,196. Ninety-two lamps will be needed.

Mysore Project

The Government of Mysore has in view the construction of a dam and power station in the Honnemaradu valley five miles up the River Sharavati from the Mahatma Gandhi plant (Jog Falls), inaugurated last year. A reservoir constructed to a height of

165ft in the Honnemaradu valley is calculated to impound 100,000 million cu. ft. of water. This would be used for the existing power station and via a balancing reservoir in the Talkalali valley would supply the proposed station where it is considered that 500 MW could be developed. The fall would be 1,400 ft. compared with the 1,200 ft. of the existing station.

Radio-equipped Service Van

The North-Western Electricity Board has just equipped the first of a fleet of electricity service vans with the G.E.C.'s system of v.h.f. radio telephony. Transmitting and receiving aerials have been erected on top of the district office in Mill Street, Macclesfield, and an area of 120 square miles is effectively covered. Both headquarters transmitter and the mobile transmitter have an output power of 20 W.

The Ripon Falls on the Nile near Jinja, Uganda. In connection with the Owen Falls hydro-electric scheme, the reservoir to be formed by the dam will cover the Ripon Falls to a depth of 14ft. When the power station is built it is intended to blast away the rock ridges and islands strung across the falls so that there shall be a free flow of water from Lake Victoria

Charges to Tenants

The North Western Electricity Consultative Council, at Preston, on 30th September, passed a resolution to be forwarded to the North Western Electricity Board urging that landlords should not be allowed to charge a higher tariff for metered electricity than that paid by ordinary residents.

Rhyl Illuminations

The promenade illuminations at Rhyl are to be continued until some time in November, but are to be extinguished at 11 p.m. instead of at midnight. Appreciation of the work of the surveyor and his staff, and of the staff of the Electricity Board, has been expressed by members of the Council.

Street Lighting Improvements

The Mayor of Tipton (Alderman W. E. Hampton) switched on a new electric street lighting system for Owen Street, the shopping centre of the district, and Sedgley Road West, at the Municipal Buildings last week. Speaking at the ceremony, Alderman W. S. Lewis, chairman of the Midlands Electricity Board, said he hoped soon to see electric street lighting all the way from Birmingham to Malvern.

Malvern U.D.C. has accepted the Midlands Electricity Board's offer to provide, free of cost, a mile of street lighting in any part of the town.

Electric Heating

Doncaster Housing Committee is to replace gas fires by electric fires in 379 houses.

Fylde Power Station

Villages in the Over Wyre district, Lancashire, are concerned by the proposal to erect a power station on the outskirts of Fleetwood. At a recent meeting of the Preesall Council a member stated they were anxious that there should be no detrimental effect to the district by emission of grit or by condensation from the cooling towers. It was stated that four other sites had been considered, but there had been severe opposition.

Earlier Load Shedding

The Northern Regional Board for Industry has asked firms in its area to introduce load-shedding schemes immediately instead of waiting until 14th November. The Regional Board was asked by the North-Eastern Electricity Board to bring forward load-shedding arrangements. It is felt that load shedding will cause less interruption to industry than constant power cuts, owing to the amount of generating plant out of use for overhauling.

Next Week's Events

Monday, 17th October

BIRMINGHAM.—Grand Hotel, 6.15 p.m. Birmingham Electric Club. "Short Circuit Testing," by V. A. Brown.

BRISTOL.—Electricity House, Colston Avenue, 6 p.m. I.E.E. Western Supply Group. Chairman's address, by R. J. Sims.

LIVERPOOL.—Royal Institution, Colquitt Street, 6.30 p.m. I.E.E. Mersey and North Wales Centre. "The Testing, Reconditioning and Servicing of Domestic Appliances," by H. Hobbins.

LONDON.—Savoy Place, W.C.2, 7 p.m. I.E.E. London Students' Section. Chairman's address on "The Testing of Power System Protective Gear," by P. W. Castle.

St. Ermins Hotel, S.W.1, 6 p.m. A.S.E.E. Central London Branch. Film show by Crompton Parkinson, Ltd.

NEWCASTLE-ON-TYNE.—King's College, 6.15 p.m. I.E.E. North-Eastern Radio and Measurements Group. Chairman's address, by G. E. Moore.

RUGBY.—Electricity Showrooms, High Street, 6.30 p.m. I.E.E. Rugby Sub-Centre. Chairman's address, by A. C. Hirst.

STOCKPORT.—White Lion Hotel, 8 p.m. A.S.E.E. Stockport Branch. "Electric Traction."

Tuesday, 18th October

LEEDS.—Lighting Service Bureau, 24, Aire Street, 6.30 p.m. I.E.E. North Midland Utilization Group. "The Measurement of Light and Colour," by G. T. Winch.

LONDON.—Lighting Service Bureau, 2, Savoy Hill, W.C.2, 6.30 p.m. Association of Supervising Electrical Engineers. Presidential address, by A. G. Ramsey.

At the Royal Society of Arts, W.C.2, 6.45 p.m. Institution of Works Managers. "Problems of British Industry To-day," by L. C. Ord. (Joint meeting with the Institution of Engineering Inspection.)

Wednesday, 19th October.

BOURNEMOUTH.—Grand Hotel, 6.30 p.m. I.E.E. Southern Centre. "The Automatic Control of Lead-Acid Battery-Charging Equipment," by R. A. Harvey.

LONDON.—Savoy Place, London, W.C.2, 5.30 p.m. I.E.E. Radio Section. Chairman's address, by R. T. B. Wynn.

At St. Bride's Institute, E.C.4, 6.30 p.m. Institution of Engineers-in-Charge. Presidential address, by Sir William J. Larke.

MANCHESTER.—Engineers' Club, Albert Square, 6.30 p.m. I.E.E. North-Western Radio Group. Discussion on "Wave Guides," to be opened by E. Colin Cherry. Also a demonstration on "The Analogies between the Vibrations of Electric Membranes and the Electromagnetic Fields in Guides and Cavities."

Engineers' Club, Albert Square, 7.30 p.m. A.S.E.E. Manchester Branch. "The Application and Maintenance of Ball-Bearings Affecting Electrical Machines," by J. D. Tyler.

Thursday, 20th October

DUBLIN.—Trinity College, 6 p.m. I.E.E. Irish Branch. Chairman's address, by W. F. Roe.

LONDON.—Dorchester Hotel, Park Lane, W.1, 7 for 7.30 p.m. Institution of Mechanical Engineers. Annual dinner.

Friday, 21st October

BIRMINGHAM.—Grand Hotel, Birmingham, 7 for 7.30 p.m. Birmingham Electric Club. Ladies' Evening. Dinner-dance.

LONDON.—Storey's Gate, S.W.1, 5.30 p.m. Institution of Mechanical Engineers. Presidential address on "Engineering Steels under Combined Cyclic and Static Stresses," by Dr. H. J. Gough.

39, Victoria Street, S.W.1, 6.30 p.m. Junior Institution of Engineers. "The Cathode-Ray Oscillograph," by G. B. Newbery.

STOKE-ON-TRENT.—Midlands Electricity Board Service Centre, Kingsway, 7 p.m. E.P.E.A. Midland Technical Group. "Bus-Bar Zone Protection," by H. Hurst.

Saturday, 22nd October

LONDON.—Hyde Park Hotel, S.W.1, 7 for 7.30 p.m. Electrodepositors' Technical Society. Annual dinner-dance.

Testing Station for Packaging

SCIENTIFIC tests to determine how well any kind of package does its job, and information and advice to help makers and users of packages secure the most suitable materials or designs for their particular purpose, are services now available to all British industries and trades through the Printing, Packaging and Allied Trades Research Association.

Up to now the Association's services have been restricted to its member-subscribers. Members will continue to receive the services free (or at special rates), but now non-members are making use of the advisory, abstracts, technical library, and package testing services on a fixed scale of charges.

The Research Association has set up testing laboratories in which anything from a transparent film envelope to cardboard cartons or boxes, wooden crates, glass bottles and jars, metal drums or cans is subjected to controlled tests to measure its strength, resistance to every kind of physical shock, permeability to water vapour, air, oxygen, nitrogen, water, fats, oils, and resistance to attack and damage by insects and moulds. Another laboratory at the Association's newly built and equipped £110,000 Research Centre at Leatherhead, Surrey, tests the effective protective life of the package in store under atmospheric conditions ranging from arctic to tropical.

Expert advice and assistance (including "on-the-spot" investigation of packaging problems or laboratory tests), is another service intended to solve individual problems.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1944

1917. Wilcox & Co., Ltd., E., and Wilcox, E.—Electric fuses. 2nd February, 1944. (629524.)

6006. Standard Telephones & Cables, Ltd.—Apparatus for induction heating and hardening of toothed members. 5th April, 1943. (629464.)

12643. British Thomson-Houston Co., Ltd.—Wattless current regulating systems for a.c. circuits. 1st July, 1943. (629586.)

1945

851. British Thomson-Houston Co., Ltd., and Cox, H. E.—Injection moulding of thermoplastic materials, particularly in the production of electrical insulation. 10th January, 1945. (629645.)

22874. Newton, F.—Control of electromechanical power transmission systems. 5th September, 1945. (Cognate application 31997/45.) (629526.)

22904. Standard Telephones & Cables, Ltd., McWhirter, E. M. S., and Ward, H. J.—Systems for recording reservations of accommodation. 5th September, 1945. (629646.)

1946

13282. Gardere, H.—Apparatus for the reception of phase-modulated alternating-current signals. 7th May, 1945. (629532.)

14316. Poole, R. B.—Colour television system. 11th May, 1946. (Cognate application 16722/46.) (629594.)

15068. Amalgamated Wireless (Australasia), Ltd.—Automatic electric follow-up switching mechanism. 18th May, 1945. (629650.)

19467. Marconi Instruments, Ltd., and Hampson, J. A.—Apparatus for measuring electrically, properties of powdered, granular and like materials. 28th June, 1946. (629407.)

21441. Landis & Gyr Soc. Anon.—Electric meter. 1st August, 1945. (629601.)

22553. British Thomson-Houston Co., Ltd.—Electric control systems. 9th July, 1945. (629604.)

24855. Soc. de Prospection Electrique Procedes Schlumberger.—Apparatus for measuring by deflection. 23rd August, 1945. (629535.)

26484. British Mechanical Productions, Ltd., and Fuke, F. C.—Electrical plugs. 3rd September, 1946. (629538.)

29117. British Thomson-Houston Co., Ltd.—Precision magnetometers. 1st October, 1945. (Addition to 629270. (629409.)

30308. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Electromagnetic relay systems for heavy alternating current. 2nd February, 1943. (629541.)

32042. Standard Telephones & Cables, Ltd., and Kelly, R.—Automatic voltage regulating equipment. 29th October, 1946. (Cognate application 36583/46.) (629542.)

36726. Westinghouse Electric International Co.—Control systems for X-ray tubes. 20th September, 1945. (629619.)

36897. British Broadcasting Corporation, and Hill, A. H.—Modulation meters. 13th December, 1946. (629545.)

1947

997. Armstrong, E. H. — Current limiting devices. 2nd August, 1940. (629676.)

2502. Airspeed, Ltd., Candeland, H., and Clarke, W. H. V.—Electrical measuring equipment. 27th January, 1947. (629478.)

3461. Lignes Télégraphiques et Téléphoniques.—Insulation of electric conductors. 21st October, 1946. (Cognate application 3462/47.) (629625.)

5005. Westinghouse Electric International Co.—Ultra-high-frequency apparatus. 11th July, 1940. (629628.)

5862. United States Radium Corporation.—Radioactive units and method of producing the same. 15th August, 1941. (629415.)

6063. Sperry Gyroscope Co., Ltd., Summerlin, F. A., and Fisher, F. J.—Alternating-current machines. 3rd March, 1947. (629684.)

11875. Western Electric Co., Inc.—Tunable resonant cavity circuits. 13th May, 1946. (629693.)

13107. Cinema-Television, Ltd., and Graham, G. E. C.—Apparatus for controlling electrical signals. 15th May, 1947. (629640.)

15010. Westinghouse Electric International Co.—Dynamo-electric machines. 8th June, 1946. (629698.)

21560. Westinghouse Electric International Co.—Flexible drives. 7th August, 1946. (629571.)

21758. Western Electric Co., Inc.—Apparatus for establishing telephone connections. 24th September, 1938. (629572.)

26263. Standard Telephones & Cables, Ltd., and Earp, C. W.—Electric frequency discriminators. 29th September, 1947. (629444.)

26455. Westinghouse Electric International Co.—Dielectric heating apparatus. 4th October, 1946. (629445.)

26456. Westinghouse Electric International Co.—Dielectric heating. 4th October, 1946. (629446.)

29488. Lucas, Ltd., J., and Parkes, E. B.—Electric lamp bulb holders. 5th November, 1947. (629456.)

29490. Lucas, Ltd., J., and Spencer, G. D.—Electric circuit connections. 5th November, 1947. (629457.)

29585. Rotax, Ltd., and Robinson, E. E.—Electric switching apparatus. 6th November, 1947. (629493.)

29629. Brown, S. W.—Electrical switchgear with a quick-action make-and-break mechanism. 6th November, 1947. (629496.)

29794. Ferranti, Ltd., Yates, J. T., and Vaughan-Jones, I. N.—Apparatus for discriminating between electrical pulses. 8th November, 1947. (629504.)

29947. Automatic Telephone & Electric Co., Ltd., Smith, S. R., and Eddowes, S. G.—Electromagnetic signalling devices. 11th November, 1947. (629510.)

29951. Broadbent & Sons, Ltd., T., and Hallitt, W.—Electrically driven centrifugal machines. 11th November, 1947. (629511.)

30032. Preece, J. — Snap-action electric switches. 11th November, 1947. (629519.)

30705. General Electric Co., Ltd., and Akroyd, R.—Electrical circuits for the suppression of pulse-type interference. 19th November, 1947. (629522.)

33682. Kobler, W., and Kobler, V. (trading as Kobler & Co.—Electric dry shaving apparatus. 10th July, 1940. (629523.)

Illumination Design Course

Applications for the current London Illumination Design Course have been so great that the Lighting Service Bureau has been unable to find accommodation for a large number of applicants. It has therefore decided to repeat all the lectures in a new series beginning on 14th November and ending on 19th December. The final date for receiving applications for the new series is 10th November.

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Ashford (Kent).—22nd October. U.D.C. Street lighting equipment. (7th October.)

Australia.—SYDNEY.—9th February. County Council. Generating plant for Lugarno power station. (C.R.E. (I.B.) 28137/49. Ten/689.)*

Belgium.—CITY OF ANTWERP.—22nd December. Electric street lighting installation at docks. (C.R.E. (I.B.) 18001/49. Ten/690.)*

Brazil.—PORTO ALEGRE.—9th January. State Commission for Electric Energy. Hydro-electric power plant at Santa Rosa. (C.R.E. (I.B.) 27419/49. Ten/688.)*

Denbighshire.—Education Authority. Heating and domestic hot water installation and electric lighting installation at Brynhyfryd Grammar School. (See this issue.)

Edinburgh.—22nd October. City Council. Electrical work required in the erection of 212 houses and 15 shops on the Inch housing site. City architect, City Chambers.

Frimley and Camberley.—31st October. U.D.C. Street lighting installation. (See this issue.)

Llangefni.—31st October, Anglesey County Education Committee. Electrical installation at Amlwch county secondary school. (See this issue.)

Luton.—7th November. Town Council. Electrical installations at Ashcroft Road Infants' School. (See this issue.)

Merton and Morden.—4th November. U.D.C. Street lighting installations. (See this issue.)

Middlesex.—26th October. County Council. Supply of electric lamps. (See this issue.)

Newcastle-on-Tyne.—Education Committee. Extension of the electrical installation at Chillingham Road Primary School (£101). Devereux Moodie and Co., Ltd.

Northumberland.—24th October. County Council. Installation of electric lighting, etc., in connection with the erection of a county primary school at Longbenton. County architect, County Hall, Newcastle-on-Tyne, 1.

Peterborough.—Joint Education Board. Electrical installation in schools. (See this issue.)

Stockton-on-Tees.—Corporation. Installation of electric lighting at the Norton branch library. Plans by the borough architect, 28, The Square, Thistle Green.

Warrenpoint (N. Ireland).—7th November. U.D.C. Electrode steam-raising unit, including electrically driven sea-water pump, with electric wiring, etc. V. Crawford, clerk, Town Hall.

*Specifications may be inspected at the Commercial Relations and Exports Department, Thames House North, Millbank, S.W.1.

Orders Placed

Coventry.—Corporation. Installation of improved lighting at the Leicester Row Depot of the General Works Department (£449).—Three Spires Electric Co.

Loughborough.—Town Council. Electrical installations at 30 houses at Shelthorpe (£780). —Sydney Walker, Ltd.

Lowestoft.—Corporation Housing Committee. Electrical installations for sixty houses now being erected on the No. 1 housing site (£1,202). —F. Gort & Sons.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Barrow-in-Furness.—Houses (156), Newbarns South estate; borough surveyor.

Birmingham.—Reconstruction and new nurses' home, Dudley Road Hospital; Birmingham Regional Hospital Board, 10, Augustus Road.

Blackpool.—Reconstruction of Hippodrome Cinema, Church Street; Associated British Cinemas, Ltd., 30/31, Golden Square, W.1.

Bolton.—Houses for T.C.: F. Powell, Bolton (30); John Brown & Sons (Bolton), Ltd. (29); and Lionel Gray (1933), Ltd. (10).

Boston.—Houses (52), Woodville Road; C. L. Hoffrock Griffiths, town clerk, Municipal Buildings.

Bradford.—Houses (150), Buttershaw estate; city architect.

Brighton.—Houses (110), Hollingbury and Lower Bevendean estates; borough engineer.

Castletown (I.o.M.).—Houses (30), School Hill, for Town Commissioners; W. T. Quayle, architect, 29, Athol Street, Douglas.

Coalville.—Factory, Bakewell Street; Towles, Ltd., Avenue Road.

Houses (80) Greenhill Road; H. B. Chynoweth, clerk, Municipal Offices.

Crawley.—Factory and offices; W. C. Youngman, Ltd., Wandsworth Works, Wandsworth Road, S.W.8.

Houses (105), West Green, for Crawley Development Corporation; Frank Bilton (London), Ltd., 33, Streatham Place, S.W.2.

Cumberland.—Police houses (10), Carlisle, and houses (44), Great Clifton, Workington, for N.E. Housing Association, Ltd.; J. Laing & Son, Ltd., Carlisle.

Darwen.—Two blocks of 24 flats, Bolton Road; John E. Beardshaw & Partner, architects, 11, Peter Street, Manchester.

Exeter.—Factory, Marsh Barton Trading estate; Tremletts, Ltd., Westgate Tannery.

Felixstowe.—Dwellings (144), Grange Road and Mill Lane site; U.D.C. surveyor.

Gosport.—Houses (32) on housing estates; E. Addenbrooke, town clerk, Town Hall.

Grimsby.—Branch bank and offices, Fish Dock; Lloyds Bank, Ltd., 71, Lombard Street, E.C.3.

Factory, Ladysmith Road; Berkley Hygienic Food Products Co., Ltd., 34a, Riby Street.

Hindley.—Bungalows (26), Castle Hill estate; U.D.C. surveyor.

Isle of Wight.—Fire station, Yarmouth; F. H. Booth, county architect, County Hall, Newport.

Leominster.—Houses (42), Westfield Walk; W. B. Bond, architect to T.C., 3, Newhall Street, Birmingham, 3.

London.—CHANCERY LANE.—Office block; Richardson & Houfe, architects, 31, Old Burlington Street, W.1.

HIGHGATE.—Block of 22 flats, Archway Road; Hornsey Housing Trust, Ltd., 5, Haringey Park, N.8.

HENDON.—Office block, Finchley Lane; S. Stern, 48, Conduit Street, W.1.

BETHNAL GREEN.—Flats (35), Moss Street; borough engineer.

Manchester.—Applied science block at Newton Heath Technical School; extensions to machine shop at Openshaw Technical School; infants' and secondary schools, Newall Green; secondary school, Moston; and infants' school, Charlestown; P. B. Dingle, town clerk, Town Hall.

Shops, flats and garages at Wythenshawe estate: Moston Brick & Building Co., Ltd., Manchester; W. Fearnley & Sons (Salford), Ltd., Salford; and F. J. Gibson (Builder), Ltd., Wilmslow.

R.C. school, Roundwood Road, Wythenshawe; Reynolds & Scott, architects, 9, Albert Square.

Nailsworth.—Extensions to works; Newman, Hender & Co., Ltd., engineers, Woodchester.

Norfolk.—Junior and infants' school, off St. William's Way, Thorpe St. Andrew, and nursery school at Emneth, Wisbech; W. O. Bell, County Education Offices, Stracey Road, Norwich.

Oxford.—Houses (190), "Easiform" type, North Way estate; John Laing & Son, Ltd., builders, Bunns Lane, Mill Hill, N.W.7.

Rawtenstall.—Houses (49), Carr Lane and Staghills estates; borough engineer, Town Hall.

Rotherham.—Laboratories, Moorgate; United Steel Companies, Ltd., Stocksbridge, Sheffield.

Houses (76), Broom Valley estate; E. J. Manson, borough engineer, Municipal Offices.

Rugby.—Houses for R.D.C.: Drury & Co., The Grange, Wigstown Fields, Leicester (22), and G. W. Deeley, 27, Avon Street, Coventry (18).

Shardlow.—Two main electrical pumping stations, Sandiacre, for R.D.C.; Elliott & Brown, engineers, Stanley House, Pelham Road, Nottingham.

Houses (14) for R.D.C.; F. S. Antliff & Son, architects, Draycote, nr. Derby.

Skipton.—Houses (16), Sutton, for R.D.C.; W. Smith, Bingley.

Stockport.—Houses (46), Curzon Road; J. Foulkes & Son, builders, Wicken Street, Offerton Lane, Great Moor.

Sutton-in-Ashfield.—Houses (86), Hardwick Lane, for U.D.C.; Sweeney & Palmer, Ltd., builders, Beechdale Road, Apsley, Nottingham.

Swanscombe.—Rebuilding premises, 18/20, Castle Street; Parker & Porter, builders, 128, Church Road.

Extensions to works; Kent Kraft Mills, Ltd., Northfleet.

Swansea.—Crematorium; borough architect.

Factory, Ystrad Uchaf; British Oxygen Co., Ltd., Grosvenor House, Park Lane, W.1.

Tottenham.—Houses (42), Park Lane, Cheshunt; R. J. Williams, borough engineer, Town Hall, N.15.

Wigan.—Pemberton county infants' school; D. M. McKellan, surveyor.

Worcestershire.—Infants' school, Cofton Common; F. Gibberd, architect, 35, Gordon Square, W.C.1.

York.—Block of flats, Paragon Street; city engineer and architect.

Trade Marks

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month of 5th October.

MEMCOL. No. 676,940, Class 7. Machines included in Class 7, machine tools, electric motors (not for land vehicles) and electricity generators, and parts of all such goods included in Class 7.—Midland Electric Manufacturing Co., Ltd., M.E.M. Works, Reddings Lane, Tyseley, Birmingham.

OMNIPOL. No. 670,809, Class 9. Electrical apparatus and instruments included in Class 9; scientific, surveying, nautical, photographic, cinematographic, optical, weighing, measuring, signalling, checking (supervision), life-saving and teaching apparatus and instruments; wireless sets (complete), coin or counterfreed apparatus, talking machines, cash registers, calculating machines and fire-extinguishing apparatus; and parts of all the aforesaid goods included in Class 9.—Omnipol Akciowa Spolecnost, also trading as Omnipol, Limited Company, Prague, Czechoslovakia. Address for service, c/o Marks & Clerk, 57-58, Lincoln's Inn Fields, London, W.C.2.

ARCOLECTRIC. No. B676,075, Class 9. Electric switches and parts thereof included in Class 9; and turntables for supporting wireless sets.—Arcolectric (Switches), Ltd., Central Avenue, West Molesey, Surrey.

KICKTONE. No. 676,451, Class 9. Electrical and electronic apparatus and instruments and parts thereof, all included in Class 9.—The Miller Organ Co., Ltd., Osborne Buildings, Timberhill, Norwich.

CEROC. No. 676,936, Class 9. Insulated electrical conductors.—Sprague Electric Co., Inc., North Adams, Massachusetts, U.S.A. Address for service, c/o Page, White & Farrer, 27 Chancery Lane, London, W.C.2.

FRANCORA. No. 678,410, Class 9. Fluorescent electric advertising signs.—The Franco-British Electrical Co., Ltd., 16-17, King Street, St James's, London, S.W.1.